

F. J. h.
The Third Edition of the

VANITIES

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Philosophy and Physick:

Enlarg'd to more than double the number of Sheets;

CONVENIENT

To be perus'd by Divines, and Students in any Faculty; but more necessarily by Physicians, and chiefly by all that would preserve Health, and prolong Life, as well in a Regular as Irregular way of Living; by Directions and Medicines herein mentioned, and easily prepar'd by any of the least Skill:

There is also now added,

A Third Medicine, without which the Design of this Treatise would be imperfect.

Offering moreover

At different *HYPOTHESES* in Metaphysicks, Natural, and Moral Philosophy; also in the Art of Physick, almost throughout the whole Body, and particularly relating to Indigestion, & other Diseases of the Stomach, Fevers, Consumptions, Stone, Gravel, Suppression of Urine, Apoplexy, Palsie, Madness, Diseases of the Eyes, and others:

With variety of Medicines and Rules, whereby to make particular Choice out of them.

By *GIDEON HARVEY, M. D.*

L O N D O N:

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THE PREFACE,

Necessary to be Read.

THE *Prima nota*, are the first Conceptions, or Impressions of things, the Understanding has received from the External Senses in our Youth, and according to which, as a Guide, Rule, Measure and Standard, commonly Mankind doth pass his Judgment afterwards of all Matters, Subjects, or Objects. This sort of Judgment *a priori* is, what is called a Prejudice, or a Forejudgment, which very oft doth prove erroneous and false, as proceeding from Conceptions, which a Man has formed in his Youth, out of apparent, dubious, or false Ideas the Senses have administred to him; and which are confirm'd in him by his Nurse, Parents, School masters, Contemporaries, and all those he usually converseth with, being supposed by him to be of a more advanced Age, and consequently of greater Experience, all which do put him beyond any manner of doubt, or suspicion of being in an error. Hence it is, so many have prejudices.

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ces, and strong attachments to various Religions, Religious Worships, and different Interpretations of Laws, and their Preambles.

The like Prejudice is observable in Young Scholars, who having tasted of the Principles of Peripatetic, or Cartes his Philosophy, nothing perhaps in all their Life time will relish, or go down with 'em.

By his more than ordinary confidence, and positive way of speaking, or reasoning, you may judge that great Philosopher Monsieur Des Cartes, was a French-man; for in the third part of his Principles of Philosophy, Paragr. 47, he boldly affirms, That Principles of things more simple, or more easie to be understood, or more probable than his, cannot be conceived, or imagined by any Man. The French Language being smooth and fluent by the number of Vowels and Liquids, the Words do consist of, is exactly fitted to the Voluble Tongues, and Volatil Airy Wits of those that speak it, which renders both them and their Lingo so fondly acceptable. Among these Monsieur Des Cartes had a greater share than ordinary in a glib way of speaking and reasoning, whereby whilst he lived at the Hague in Holland, he easily slid into the acquaintance of the highest Rank, but chiefy of Monsieur De Zulichem (Secretary to his most Illustrious Highness the Prince of Orange, Father to his most Gracious Majesty) the Princess the Queen of Bohemia her Daughter, and Prince Philip her Son, daily trotting from the one to the other. The Princess observing so great a strength of reasoning in his way of Philosophizing, commonly making room to usher in some
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Points of the Popish Doctrine, was easily overpowered to change her Religion from Protestant to Papist (no Person about her being able to discover the Priest, or Author of that Religious Perversion) insomuch that it was not long, before she conveyed her self secretly into France, where she was immediately received Lady Abbess of a Monastery (if I mistake not) at Pontois. Prince Philip being no less pleased with this Philosophers Conversation, was also perverted by him to Popery, who soon after, upon a very unusual accident, was likewise obliged to hasten into France, where he married a French Lady of an high Birth, and great Fortune; and very probably, had Death not prevented, this great Philosopher (I will not say Religious Sophister) would have seduced several Protestant Princes of Germany. After the finishing his Work in Holland, he was sent to Sweden, with such a Character and Commendation, that he soon gain'd Access to Queen Christina, who being pierced by the force of his arguing in Philosophy, intermixing at due seasons Papistical Discourses, she readily yielded to his reasons of Exchanging Lutheranism for Popery, and in consequence to that soon transferred her Kingdom to her Kinsman, and so went off to Rome. From these practices it may be greatly suspected (though to me it seems beyond suspicion) Monsieur Des Cartes under all his Disguises of a Gentleman, Scholar, Soldier, Philosopher and Mathematician, was a Jesuit, or at least a Missionary from that pestilent Society, which has been so oft detected to have had their Hands in the Blood of Princes, and the subversion of Governments; so that they

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may justly be call'd the Black Guard of the Infernal Monarch. Neither can it be much doubted, but his Principles of Philosophy, his Methods of reasoning, and finding out Truths, were concerted and ventilated by a Cabal of that Infernal Gang, and lodg'd in him to make the best use of 'em, but chiefly ad propagandam fidem. Wherefore we are not to give Credit to all those fine things Borellus relates of him, in the Description of his Life; though it must be granted, he was an admirable Philosopher, and of an incomparable Capacity and Ingenuity, but a Disguis'd Jesuit; of which sort, it's little to be doubted, there are swarms in most Cities, Towns, and Countries, under all manner of Shapes, insinuating into the Acquaintance and Familiarity of all Ranks and Degrees of Persons (doing the work of their Black Prince) in perverting their Judgments in Secular and Spiritual Matters. It was for that reason the said Monsieur Des Cartes was publicly banish'd the University of Utrecht after their Mode, by Ringing the Town Bell, and not for Contradicting (as Borellus insinuates) Henricus Regius, Voetius, and other Professors of that place, they themselves being as heterodox in their Lectures, as they could possibly be.

The Young Physicians upon having assumed a Prejudice in Natural Philosophy, which is the foundation of Physiology, Pathology, and other parts of the Art of Medicine, proceed in the *Canonicum Avicennæ*, viz. *Elementa*, *temperamenta*, *humores*, *spiritus*, &c. which being so radically ingrafted in them, they can scarce ever

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ver be conducted into more probable or true Sentiments of Medicine, by all the sensible or experimental and demonstrable Reasonings that can be offer'd; whence it happens, that the Art of Physick is very little advanced in the practical part since Hippocrates or Galen; and Diseases continue as much unknown, as their Cures are unsuccessful, most of them being perform'd meerly by Expectation.

These Matters being well considered, its necessary all Men, when arrived to maturity, in their several Capacities ought to doubt, and examine by an unbiassed and impartial Judgment, whether any thing they have imbibed in their Youth be true. This being so generally neglected, proves the Cause of all our Ignorance, Mistakes, Errors, and retardment in the advancement to the knowledge of Truths; even the Mathematicks, as evident and demonstrable as their Principles, Theorems, Axioms, and Postulata are, seem to labour under the same Difficulties, and want of resuming the same Scrutiny from the bottom. To conduct the understanding in those Inquiries, the Ancients have compiled the Art of Logic, which is no other than an artificial Path to lead you directly to the knowledge of things, by preventing your aberrations into by-ways; but how successful that Art proves in its pretensions, may easily be discerned by the commonalty of Logicians; and, to speak plain, it is so little valued, and of so little use, that most of the Learned esteeming it ridiculous and pedantic, wholly despise it.

Throughout the greater part of this Treatise I do offer nothing positively, being dubious of abundanc

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dance of things that pass generally for current, specially in Metaphysics, though in the Natural and Medicinal Parts I have presumed to be somewhat less ambiguous, having spent most of my time in the study of 'em. However I do greatly wish, not out of the least ostentation, but a sense of my own incapacity, that out of the Number of so many ingenious and industrious Persons, both in and out of our Universities, some one or other would out of a true desire of improving and advancing Philosophy and Medicine, animadvert, convict and correct all those seeming Contradictions, and perhaps many real ones, Errors and Mistakes these Sheets may contain, which I shall not only willingly bear for the end aforesaid, but upon my Sentiment of being truly convicted I shall return him my sincere Thanks, and acknowledge I was in the wrong, provided always, that he doth plainly shew me, where and how I may be put in the right; for unless that is perform'd, he evidently grants he is as erroneous and ignorant as my self, and has done nothing. Turpe est Doctori, quem culpa redarguit ipsum. I could also wish that sort of laudable Performance were first begun candidly, and without arrogance, in the Natural and Medicinal part, by some Learned and Expert Physician. Whoever is pleased to give himself that trouble, ought to peruse these Writings more than once or twice; for being deliver'd in a narrow compass, they cannot easily be apprehended, either by Reason of my own insufficiency of Expression, or of the number of Faults of the Press, both literal, as genuin for genuin, crassemæ for crassissimæ,

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me, and many more; and in the Sense, wherein the Aberrations are more than a few, all which the Ingenious Reader may supply.

By the way I ought to advertise the Candid Reader, that I lay a great stress on my Discourse of Acids or Acutes, and Obtuses, Nature chiefly making use of those Figures in her Mechanic (if I may so term it) Operations; and for that reason ought to be read with great heed, and be well consider'd, specially the said Discourse being the ground-work of Corpuscular or Sensible Philosophy; and more particularly of the intire Art of Medicine both Theoretic and Practic, without the knowledge of which its scarce possible for any Man (in my Opinion) ever to arrive to be so much as a tollerable Physician, or indeed any Physician at all.

In the Metaphysics it's wholly unnecessary to waddle with some impertinent QUARE's, as whether rational Souls were all created from all Eternity, or decreed from all Externity to be created in time, when Bodies should be ready to receive them, or such like hereafter mentioned in this Treatise. In the Corpuscular Philosophy it's partly omitted, that all Sensation is passive only, viz. by Impression, or Compression of external Sensibles, by Impression being to be understood a pressure made by acute angled Bodies or Particles, and by Compression a pressure made by obtuse angled Bodies or Particles. I have likewise omitted enlarging the Discourse upon Consumptions, in the process or growth whereof I have observed (if I mistake not) three Degrees or Stages, chiefly here in this Island, and not so commonly else where.

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where. The first is a long or Chronical Cough, neglected by not being timely remedied by proper evacuations of the abounding vitious Lympha of the Glanduls about the Stomach and Gullet, not one Cough in Ten (in my Opinion) being occasioned primario and per se, by any Distemper of the Lungs or asperia Arteria, and impossible to be caused by any Catarrh from the Brain, a meer Galenical Cant, as I have shewed below in this Treatise. In the beginning of this Degree the Glandulous Lympha is oft crude, thin and froathy, and sometimes it's so thin, that nothing is expectorated, but is only attendid with a strenuous Cough.

The next Stage is, when the foresaid Lympha doth contract an improper putredo; for properly it's Derivation from putere, implies it should be attendid with a Stink, and then it's Synonymous with corruptio, i. e. ruptio vel solutio mixturæ, or syntheseos corporis; but Philosophers having no proper Word, for what they intend by it, are compelled to use it in that improper signification, meaning thereby a tendency to corruptio. By the foresaid Putredo the forementioned glandulous lympha is very much thickned, and from that thicknoss oft-times by fusion, as it were through the Heat of a latent Febris Lenta, grows somewhat thinner, but tinctur'd sometimes yellow, green, duskyish, blewish, and other times is expectorated, variegated with all those Colours at once, and oft varying in a day, the morning Spittle differing from what's observed all day, and the night Spittle differing from either.

The third and last degree is discovered by a Stink those Expecterations, as likewise their Breath
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are attended with, and then the Lympha is thoroughly corrupted, as also the Glanduls themselves, which are now and then in little Particles brought up with the Spittle, which the vulgar terms pieces of Flesh, and by mistake, pieces of the Lungs. By affinity, or rather vicinity, and communication of parts the Glanduls of the aspera arteria, and the Lungs, are affected by Ulcers, whereunto continual hard Coughing is greatly contributing; but this case doth not happen so very oft, hundreds of Consumptives expiring without the least Ulcer in their Lungs, or Wind-Pipe; tho', generally speaking most parts of the Body appearing rotten.

This last Stage is beyond all controul incurable; for what is corrupted, or rotten, be it any Bowel, or other Part, can never be restored without a new Generation. In this first degree there is always a tarache, or commotion of the animal Spirits, (as appears by the pulsation of the Arteries being quicker than usual) which in the second passeth into a small indiscernable hectic Fever, that by process of time becomes a confirmed Hectic, upon which an evident wasting of all the Parts doth ensue, and an universal quick, low, weakly Pulse, with an even smart Heat, not discoverable by the Patients, unless by a flushing Heat in their Cheeks, and a Glowing in the Palms of their Hands, and Soles of their Feet, some few hours after Meals, and oft in the beginning of the Night.

This second Degree is sometimes Cured by a spare convenient Diet, and change of Air, but for the most part is attempted by Sugar (as Sugar-Candy, prunide Sugar, &c.) and sugar'd Medicines,

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Medicines, (as Conserves, Candids, Syrups, Lobbs, Electuaries and mixtures, Fuleps and Sugard Decoctions made of pectoral Ingredients, as they term them) so far from succeeding, that they rather increase those foul evacuations by Cough, or Hauking, and occasion such like Expectorations, where there were none before, all which I do seem plainly to make out by this single instance. Most Children and many others that are grown up, upon oft eating quantities of Sweetmeats, Sugar, and Sugard Compounds are subject to have their Gums swelled and inflamed, their Teeth render'd loose, and to ache vehemently, to Spit, Hawk, and Cough, to be Drowsie, heavy Headed and disinclined to stir or move, to have weakness in the Joints, to look of a very ill Complexion, besides being incommoded with many other Distempers and Symptoms, as to be frequently Feverish, Droughty, and incident to an Hectick Fever, and a consumed emaciated Habit of Body. Now we are to inquire, by what means, manner, force, and quality Sugar and sugard Composts should excite or cause such pernicious Effects, the worst and most frequent whereof is an Hectic Fever, an Hectic Cough, and a true Hectic Consumption, in opposition to every scbetical atrophie or wasting of the parts, a little ordinary transient Cough, or inconsiderable Feverish Ebullition, &c.

The Analysis of the Synthetic parts of Sugar in the Stomach will easily detect to us this whole matter. viz. it's dissolved by the Digestive Spirits into an aethereal Spirit not unlike that of Spirit

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of Wine, an acid Salt, and a sort of a glutinous or clammy Earth that tyes 'em together. This appears farther by distillation of Sugar dissolved in warm Water into a Wort, which by Fermentation having opened the Body, and disunited the clammy Earth from the other parts, doth by means of an Alembic readily yield the Spirit. The Wort likewise after Fermentation being put into a Barrel in the hot Sun or Fireside, whereby the Spirit being driven out from it leaves the acid behind it in the form of what we call Vinegar; the clammy Earth which before the fermentation gave it that glutinous smoothness, and sweetness, is lost by being subtilly pierced through, attenuated and thorowly mixt with the Vinegar. The Spirits^d of the Sugar that thus separated in the Stomach, unite with the Spirits about that Entrail, the Acid or Vinegar of it penetrates into Lymphæducts of the Glanduls of the Stomach and Gullet, and being heaved up by the foresaid Fermentation to the Glanduls of the Throat and Mouth, and particularly the Gums (whose Circumvestient Membrane is common with that of the Stomach) by its acidity or pointed Particles, swells, gnaws, and puts the said Membrane into exquisite pains. The said Sugar Vinegar mixing with the Juices of all the Body doth cause those other Symptoms recited before; the explaining the manner how would take up too much room in a Preface. It appearing then that Sugar and sugard Medicines are hurtful, also by matter of Fact of Thousands that have made use of 'em in Coughs, which

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notwithstanding have, and daily do pass into mortal Consumptions, we ought to have recourse to a different Method, and far different Remedies, improper to be inserted here.

Notwithstanding what's hinted before, Sugar may be so prepared by blunting its acid Particles, or whatever is detrimental in it, that what is remaining of its balsamic Particles may be preserved, and consequently render'd very beneficial to Consumptives.

There is also observed another sort of Cough, occasioned by obstruction of the Lobes of the Lungs through viscous, tough and slimy parts of the Blood; for considering the Lungs, by their office, to be strainers, and by their continual motion to be refiners, subtilisers & purifiers of fuliginous steams, and other heterogeneous Particles and exalters of the Blood, by intermixing pure æthereal Particles of the Air; what Particles are viscous, gross, saline, and slimy, cannot pass but are apt to stick in those streight Passages, without causing any Cough by irritation (the Lungs being insensible in their substance through defect of having any Nerves inserted into it) which however by continual motion are gradually protruded to the Bronchia, that are very sensible, and there occasion those strenuous and sometimes suffocating Coughs, until they are thrown up by expectoration in Asthmaes; or if it so happens, that by their extreme visciduity they cannot be moved, by stagnation acquiring a greater acrimony are either formed into Abscesses, some greater, others smaller, or are turn'd into purulent matter, occasioning
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Ulcers, and sometimes converting the whole substance of a Lobe into a *materia purulenta*, or *ichorosa*; upon all these accidents a Consumption with an *Hectic Fever*, or a proper *Phthisis* must ensue, and different methods of Cure must be taken, and various Remedies advised. If those foresaid viscom Particles happen to be thrust towards the outermost Parts of the Lungs next the Breast, there perforating through the Pores of their Circumvestient Membrane, are apt to stick and cause a fast attachment to the Pleura, as has oft been observed in expired *Asthmatics*, and others, of whom during Life, there was scarce any suspicion of it. Moreover if the said Viscom Particles happen to be copiously perfused through the *Parenchyma* of the Lungs so as to make a great Dam, thereby giving a stop to the passage of the Blood, according to the degree of the said stoppage, must either cause a sudden Suffocation and a sudden Death (which the taking of any narcotic in those cases will and oft has caused the like) or occasion a *Pleuripneumonia*.

I ought here to justify my self against a Complaint that is frequently made, for concealing the description of the Elixir mentioned in this Tract, as also of other Medicines found out by me, and discoursed of in other Treatises formerly published. To this I must reply, that having heretofore disclosed several very good Medicines, which have since and still are made use of by every little Empiric and other prigs, that are unskilful enough, and by misapplication have sometimes proved to be detrimental

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detrimental to Patients, I am not very free to communicate some of 'em; though bycause my labour in that kind may not be lost, I have imparted them to my Son, who is a Physician also, and may hereafter divulge 'em as he thinks fit.

To conclude, I am only to make this Apologie for attempting to offer at the exploding of so many Vanities, and perhaps Falshoods in Philosophie and Physick, and substituting Opinions far different from what are commonly received, that the pains I have taken in this kind, tend purely to a publick good, and advancement of Learning, and though possibly I have in great a measure failed therein by reason of my Imbecillity, I may at least hope for Ovid's Reward;

Si defunt vires, tamen est laudanda voluntas.

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No less necessary to be Read.

H^Ere is no stout Dedication to any *Illustrissimo* for a Protector, who beyond all peradventure knows nothing at all of the matter; and tho' you should flatter him with all the *Hyperbole's* of his Family or Ancestors, and of his great Endowments and heroick Virtues, yet he would think himself not paid in full, for lending of his Name to adorn your Frontispiece. The motive of publishing this Tract, is not the intercession of Friends; for none of 'em ever had the view of any part of it. Nei, ther would I be so Unfortunate to please many of the *Faculty*; for that must infallibly draw upon me the Envy and Hatred of Ten times the Number, besides Calumnies and Reflections. The chief inducement proceeds from an Inclination to Mankind, to instruct them, to preserve and prolong their Lives; thereby to prevent them from using fraudulent Quack Medicines, (which are now become so Universaly vendible among them) or advising with such as are wholly Ignorant, and consequently very Bold. I do in no wise pretend in these following Sheets, to make a Lecture to the Learned; tho' I should think my self sufficiently rewarded for my Pains, if I could arrive to the point of advancing the Art of Physick, by offering to them my Observations on the pretended and fallacious *Methodus medendi*, depending upon false *Indications* (receiv'd for true) abstracted from

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Diseases and their Causes, and by proposing the Trials I have made of the best and most celebrated Remedies, which upon diligent inquiry in my thoughts I could not find to have contributed any thing towards the curing of Diseases, and tho' removed upon the use of 'em, I am certain ought to be ascribed only to time and strength of Nature, and to be term'd *Curing Diseases by Expectation*. Besides, I hope by making so great a Number of Doubts, and moving as many Difficulties, to have done some Service to the Art, in giving learned Men the occasion to remove them, and to take seriously into their Consideration, whether all, or most part, and indeed any part of what the Ancients have transmitted to us concerning Diseases, and their pretended Remedies recited in their Books, and by others afterwards compiled into *Dispensatories*, ought to be received by us with an implicate Faith, so as to doubt less of the truth of them, than of those fine Histories of an *Alexander*, or a *Cesar*.

After all, I must tell you, a Self-Interest prevail'd very much with me in the printing of this, which is, that Writing an ill Hand, and being puzzled sometimes to read it, and the Matter not digested into any sort of order, I might have a more easie recourse to my own Thoughts and Sentiments, being expressed in Characters more legible, and so disposed, that I could then more readily turn to them.

I do also think my self obliged to take notice, that in the following Discourse I have very much receded from those Opinions written by me in former Treatises, whereinto the almost universally received Doctrines of Authors, and my neglect of Examining of them rationally and experimentally, had led me, as you may more particularly observe hereafter, for all which *Tolerance in Adolphus, Art. V. Sc. iv.* seems to make a sufficient Apology, viz.

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*Namquam ita quisquam bene subducta ratione ad vitam fuit;
Quærit, atq; usus semper aliquot apparet novi,
Aliquid moneat: Ut illa, quæ te scire credas, nescias,
Et, quæ tibi putaris prima, in experiendo ut repudies.*

The Sense in English it; That no Man ever made so exact a Calculation of matters in his Life time, but either the occasion of things, or length of Years, or Experience, doth offer something that's new; and gives you to understand, that what you thought you knew very well, you do not know at all; and causes you by making Trials to reject that, which before you did most approve of. But beyond this, Cornelius Celsus, the great Latin Physitian, generally Stiled the Latin Hippocrates; makes a very excellent remark fit to be taken notice of by all Physitians, sc. lib. 8. cap. 4. *A suturis se deceptum esse Hippocrates memoria tradidit, more scilicet magnorum virorum, et fiduciam magnarum rerum habentium. Nam levis ingenia, quia nihil habent, nihil sibi detrahunt. Magno ingenio, multaq; nihilominus habituro, convenit etiam simplex veri erroris confessio, præcipueque in eo ministerio, quod utilitatis causa posteris traditur; ne qui decipiantur eadem ratione, qua quis ante deceptus est. Sed hæc quidem alioquin memoria magni professoris, uti interponeremus effecit.* The meaning is, Hippocrates did recommend it as a memorial, that he was deceiv'd by the Sutures (of the cranium) to wit, after the manner of great Men, and such as had the trust of great things, for slight understandings, bycause they have (or know) nothing, they detract nothing from themselves. To a great understanding, and one who is to know or be capable of a great many things, a plain confession of his true error is very becoming, and chiefly in such an employ, which for its usefulness is to be recommended to Posterity, to this end, that those may be prevented from be-

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ing deceived in the same manner, that one hath been deceived before. But the remembrance of a great Professor hath been the occasion of my setting these things down here. But alas, where is that honest Physitian, or (in *Celsus* his own phrase) that great understanding to be found now adays, that will be so charitable to the World, as imaginarily to endanger his Credit, by observing his own and others their mistakes in any Art, that is so uncertain, and conjectural, and its Subject, viz. the Body of Man much more, and most of all the remedies, that are the tools? Where is the Discredit in a Physitian's owning, that to a Female patient, afflicted with most direful symptoms of that Disease, that goeth by the Name of an Hysteric Passion, and though reduced to a very low ebb of Strength, he advis'd a smart Purge of *Extractum Rudit*, to the intent to carry off such Saline Gross Slimy Humors, out of the Putrefaction whereof these noxious steams did arise, that occasion'd those dangerous effects, though instead of abating, the Distemper was so Furiously exasperated by the Purging Medicine, raising all the putrid Mud in her Mesentry and her Bowels; that though she very narrowly escaped, yet it cast her into such an extremity of Weakness, that it was the Work of some Months, before she could be reduced only to that State, wherein he found her? Now how Glorious such an observation would prove, in giving such a Land-mark to hundreds of Physitians, that through Ignorance of it, have sent many to their Graves, must readily be asserted by all Men? Neither would it in any wise detract from the worth of a Physitian, did he acknowledge, that he had prescribed a very gentle Purge of *Senna* and *Rhubarb*, in infusion, with the dissolution of some *Manna* in it, to one lying ill of a continual malignant Fever, and had observed,

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that the next Day the Distemper had invaded the Brain, and the Nerves in such a manner, that the patient Died the third Day after it. This observation would have been very serviceable to many, that had Purged their Feverish patients into their Coffins. Moreover would it not be very laudable, should a Physician remark, that he had more than once prescribed Whitlow Grass in form (*Paronichia vulgaris*, or, *cum Folio rutaceo*) to several afflicted with the King's Evil, with no other Success than so much loss of time, wherein possibly the Disease might have been either abated or cured, by more approved remedies; though it is confessed, that the foresaid Herb, is recommended as a Specific in that case, by a great Philosopher, very Eminent for Learning, Judgment Piety and Honour; but on the other Hand I apt to suspect, that great Man, as also the great Lord Bacon did take such matters too much upon Trust. Notwithstanding that so Honest and useful precept, though enforced by the Authority of so extraordinary a Physician as Celsus, and approved of by all Honest Men of the profession; I do find many Physicians are highly Criminal in that point, who in their Writings and Observations affirm, to have performed such wonderful Cures by the method, and remedies, which they set down, be they never so fictitious or false, with a plain intent to advance their repute, as a necessary means to acquire Riches by it, though the Consequence must be a deceit and Imposture put upon all Man-kind; and of this so Pernicious a Crime none is more Guilty, than Zacutus Lusitanus the Jew, and many of greater Fame than he could pretend to. Van Helmont's recital of the Wondres (which if true, are rather to be called Miracles) of the Irish Butler's Stone of Salt and the Oil, though but one Spoonful, which it had but toucht, that one drop of this Oil being

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inwardly taken, should by irradiation quicker, than lightning remove any Disease out of the Body, though never so great, or remote in an instant, is all Imposture, as the very manner of his Relation of the sudden cure of his Fellow Prisoner Priest in the Castle of *Vitvard* doth plainly Evidence, to be nothing but confederacy between them (to get Money for both their maintenance) that the Priest should mimick himself so diseased, and so speedily cured, of which sort of Impostures the reading the Golden legends will sufficiently inform you, the Popish Priests are very pregnant. As for his other Narratives they seem to me all Fabulous, though they wrought so much upon his Enthusiastic credulity (which all Arch-Chymists are indued with) as to stretch his Phantasie upon the *Archens*, *Gas*, *Blas*, *Drif*, *Du-telech* and many more uncouth Terms, to render his Enthusiasm and fictitious citations not otily probable or possible, but real truths. If this poor ignorant Popish *Buttler* had been possessed of such a Stone of Salt, and of the secret of making it, is it probable, he would not have contented himself with one small one, but would have made a Cart-Load of them, to have procured greater Riches than any Emperor? Which objection is cunningly answer'd by *Van Helmont*, in telling you, that *Buttler* hated Money; a likely matter, to lye in a Dungeon for Debt, ready to be Starved, and to hate Money. The Impostures of the Philosophers Stone, to which the wonderful Curing of all Diseases in a much higher degree, is attributed, as well as a power of converting all impure Metals, Iron, Copper, Pewter, even Pepple-stones into Gold, are much of the same kind, as the former; and the same Arguments, besides others that Philosophically prove its possibility, are of much higher Strain; and those Philosophers, Pyrotechnians or Philosophers by the Fire, Adepts, Arch-chymists, or what else they

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they please to entitle, their selves, deserve no better Names than Cheats, Impostors, Beggars, and Vagabonds, among which the Chevalier Borri, formerly stiled Prince Borri, did shew himself not the least in defrauding a Nothern Prince of many Thousands upon the foresaid account, and afterwards became a Fugitive and a Vagabond, until he was seized at Vienna, to be carried into the *Inquisition* Dungeon at Rome. Many Authors have Written to their own Shame, that they have seen the experiment of converting course Metals into Gold, by being present at the projection, and at the taking the Gold, out of the Crucible, and have by the Touch-Stone, and Weight found it to be Gold, but in a small quantity of a few Grains, not considering that the cheating Chymist by slight of that Hand had dropt in the Gold before, or the Gold was inclosed in the Melting-pot under a false bottom, besides twenty other tricking ways. But why was there not a great deal of Gold made at the same charge and trouble, to make these poor Rogues rich at once, or what is become of the secret? They will tell you, they did not live long enough to make themselves rich, and so the Secret dyed with them; but why was not the Secret purchased? The answer is easie, because they askt too much Mony for it. I cannot but extremely blame those Learned Men for publishing to the World their own credulity, and their being Eye-witnesses to such Gold makers, whereby as they have been cheated themselves, are an occasion of runing many others that by giving Credit to what they write, they have seen done, do put themselves upon the expence of their All, to find out an impossibility.

The steps these Impostors usually make to draw in the unwary, that have some Mony by them, and desire to improve it, are; first, they judg it necessary to be clothed in some rusty old black Habit, to shew they have been very studious, cu-

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pious and industrious in managing of the Coals, until they had brought their matters to perfection, at the end of which, they tell you, all their Money was spent. Then they shew you a piece of rough mixt Metal, of which if there be a few Grains of Gold in it, they will impart a piece of it to you, to carry to the Refiner, who soon doth separate the Gold from all the Dross, which they expect to have return'd to them again. If this takes, as oft it doth, they go on in the manner an Acquaintance of mine was lately managed. This Person having well swallowed the bait of a pretended *French* Chymist, was easily encouraged to lay down Forty Shillings to set up Furnaces, and buy Retorts and Alembicks. The next charge was the like Sum to buy Materials for to prepare Gradatory Waters; and the last was (now his Man was got so far in) to exact Thirty or Forty pounds of him in Silver Moneys to be turn'd into Gold, or more if he pleas'd, since the charge and Trouble of converting a greater Sum would be no more then a lesser. The Money was told down to him; a few days after he brought him a mixture of Lead, lithargyr of Gold, and some other Drossie things together in a Crucible, and told him the work was completed, and he might carry it to the Refiners, withal giving him the several Receipts to make the Gradatory Waters. The Person soon found he was cheated, and the Money all sunk; he askt me, whether the Chymist might not be Prosecuted for a Cheat, of which I made no manner of doubt. After this Entermess of Discourse, its time I return to the reference I made to the Quotation of *Terence*, which I must own to have found true in my self, and particularly in reference to continual putrid Fevers, which are most common in *France*, and malignant Fevers most frequent in *England*, very few of the former being observed here. I did as near

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as I could imitate the generality of Practisers in curing of them; I advised Bleeding as frequently as others, tho' nothing near so frequently as now they do, which is a far greater Error in malignant Fevers (as most of ours are) than in those commonly call'd Continual Putrid Fevers; not forgetting cooling Apozems and Juleps, that allay the heat, and abate Thirst; sweating Juleps and Pouders to drive out the Heat, that is, those Nitrosulphurous and Bituminous Particles that might occasion that Heat, as I then thought, and and not neglecting Glystering and Blistering; for I did observe, that whoever died without the application of Spanish Flies, the Vulgar did most certainly impute the Cause of that Man's Death to the Ignorance or neglect of the Physitian, in not applying of the *Tormentors*. Upon the calculation of the whole matter, (as *Terence* saith) I found by length of years, that *ceteris paribus*, as many as were not physically treated, recovered, and in some Seasons many more recovered than those that had been oft Blooded, Cordial'd and Sweated, Glyster'd and Blister'd: Which wrought this Opinion in me, that all the *Hypotheses* of Fevers, whether seemingly true or false, were of no manner of service, to ground the practical part upon; for even now do what you can, the Fever walks on from the *Beginning* through the *Augment* to the *State*, and if the Patient hath not been over-blooded, or preposterously purged, he may pass through the *Declination* to a condition of Health. This being seriously observed by me, put me upon forming a different *Hypothesis*, and Indications conformable to it, whereunto the *Indicata*, or remedies responding do evidently and sensibly abate the Cause and Symptoms, without suffering the Fever to run up to a state. I have had very lately occasion to make Observation upon a sort of malignant Fever, that was popular about us. They
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were generally taken with Coughs, Drowlineſſe, Moveable Joint-pains, commonly termed Rheumatic Pains; ſome did ſpit Blood, and afterwards Matter; they were for the greateſt part free from Drought, their Urine of a good Colour with a whitish Sediment, the Pulse ſlower than uſually in the ſtate of Health. They generally ſaid they ailed nothing, they were not Sick, but they had gotten a great Cold, tho' they were ſuddenly reduced to the greateſt weakneſs. Thoſe that upon their own heads, were Blooded after the fourth Day, or were Blooded more than once, died. Others that were Blooded ſparingly once within the two firſt Days, ſenſibly recovered upon the uſing of an uncommon *Antifebris* Medicine. Another miſtake I have oft taken notice of, importing, That what is expectorated by Patients properly Conſumptive, by reaſon of an Ulcer in the Wind-pipe, or the *Bronchia*, (for it is not frequently obſerved to be in the Lungs) attended with an Heſtick Fever, is all *pus*, or a *materia purulenta*, which is not poſſible; for ſhould all that thick glary, greeniſh, yellowiſh, and ſometimes whitish matter be *pus*, that's expectorated by ſuch, which I have ſeen hath exceeded the meaſure of a Quart, and more, in four and twenty hours, it would exceed the quantity of forty or fifty very large external Ulcers, tho' ſituated near great Veſſels; ſo that I conceive there is only ſome purulent matter, mixt with a Slime corrupted, and putrefied to an extremity, and therefore that commonly is not only attended with a ſtink, but all their breathing out of their Lungs, and Pores of the ambient Skin, ſtink; as doth alſo their Viſcuals, if by chance they happen to Vomit them up. Wherefore I do apprehend, that all the Humours in their Veſſels are corrupted and ſtink, and that all their Bowels are tainted: So that the French have no other Word to denominate a

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Consumption, than *Pourie*, which signifies rotten: Were it only an Ulcer, the Difficulty would not be very extraordinary, that being easily Cur'd; for we see daily, that the Ulcers occasion'd by a *Pleurisie*, and a *Peripneumonia*, are oft cured very speedily of themselves, without administering any Medicines. To pretend to cure a *Consumption*, is equal to make a new Man, new Bowels, and new Humours: It is in the beginning only this Disease admits of a Cure, and which must be perform'd with Remedies very uncommon.

Before I leave this Subject, I ought to obviate a very considerable Objection, viz. A Stinking Breath, which some are affected with during the whole Course of their Lives, to a degree, that they are capable to perfume a whole Room, is commonly supposed to proceed from putrefy'd or rotten Lungs, notwithstanding is seldom or never attended with an Hectic Fever; and as incredible as it is, is not accompany'd with a rotten Cough, nor doth it taint the Bowels, nor infect the whole Mass with Putrefaction; and therefore an Ulcer in the Lungs, *Aspera Arteria*, and *Bronchia*, cannot import that Danger, nor infect the Bowels and Humours with a Stink and Putrefaction, as the fore-going Discourse seems to insinuate. This difficulty is easily remov'd: That sort of Stinking Breath, which is here instanc'd, doth not proceed from the least Putrefaction of the Lungs; for very oft those Persons so affected have very sound Lungs, breath well and free, live to a great Age, and digest their Viuals very well; which is a sign also, that neither the Stomach can be suspected to steem up such a lasting ungrateful Fume, tho' it must be granted, that a stinking Breath may for a time be occasion'd by Steams, arising from a foul Slyme in the Stomach, corrupting there, and relaxing the upper Orifice so, as it doth
not

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not close so exactly as it ought: But this is soon cured, by clearing the Stomach by a Vomit, or Purge. You are therefore to apprehend, that the Cause of a perennal Stinking breath in those healthful Persons, is to be imputed to Slyme ousting daily and hourly out of the Glanduls of the Throat, and harbour'd in some deep small hollownes or Crevice near the Tonsils, and sometimes on the back-side of the *Uvula*, either towards the Right or Left Tonsil, where being kept long, and constantly meeting there with a putrid Slyme that was left there before, doth corrupt and putrefie the Slyme that ouseth thither every Moment; The Breath of the Lungs passing by, carrieth those putrid Steems with it, and so causeth that Stinking Breath, which is but very little amended by sweet perfum'd Lozenges, chewing of Orange-peel, Spices, or sweet Confects. The only Palliative Remedy is, to use a strong absterfive penetrating Gargarism four or five times in a Day, especially in the Morning soon after Rising, and at other times after Eating and Drinking, made of a good quantity of Wormwood-tops, Century flowers, Orange-peel and Juniper-berries, boild in Vinegar, or White-Wine, sharpen'd with Spirit of Sulphur. This, by piercing into that Crevice, or Hollownes, and wiping off the putrid Slyme, removes the Cause, and renders the Breath very tollerable for a considerable Interval, and by chance may in time wholly cure it, tho' commonly it is incurable.

To conclude; I do wish, that what I have publish'd in these following Papers, may be as serviceable to others, as I do conceive (if I am not under a mistake) they are, and have been to me.

THE

THE
VANITIES
OF
Philosophy and Physick.

CHAP. I.

Representing some Vanities of common Receipts, Herbs, and Herbals.

1. **T**Ho' all Nations are indued with various Specifick Qualifications, wherein each differ from the other, yet that of Credulity, or an easie rash and inconsiderate Belief may be conceiv'd, to be universal to Mankind, and to which not improbably ought to be imputed the sequel of the most frequent and greatest Errors, Deceits, and Impostures, most Men are daily and hourly plunged in, as the source and spring of all, as may be plainly Evidenced in each of the Three subsequent Faculties, I mean

mean Divinity, Law, and Physick. The *Popish*, *Mohometan*, *Sun*, *Moon*, and *Devil* Worshipping Religions, embraced by such innumerable Multitudes, also all Heresies, Schisms, pretended Witchcrafts, Sorceries, and Exorcisims, howsoever erroneous, imposing, and deceitful, these all may be censured, flow from no other head or fountain, than an easie inconsiderate Belief given to the Insinuations of cunning subtle litle Priests; And he that gives a precipitant credit to the Language of a Seller of Land, Houses, or other Merchandizes, doth not rarely repent his rash Belief, especially when he adds to his Error, his too easie acceptance of relief, from the doubtful Remedies of a vulgar Lawyer; But it is the third Topic before mention'd, is design'd for the chief Subject of the present Discourse, which I shall endeavour to explain in its extent.

2. That most of Men do very readily take upon trust any Remedies or Receipts, that are confidently recommended to them, can scarce be contradicted; and their fond Passion, in the inconsiderate belief of 'em is so great, that without any loss of time, they are to be Registered in their Book of Receipts, handed to them possibly by their Grannam, and *Archive* like to be lock'd up in their Desk, secur'd in a lock'd Closet, within a lock'd Room. Three such Locks being broke open by a Notorious Thief, Stole thence a Hundred Pounds in Moneys numbered, and a Book of Manuscript Receipts finely cover'd. The Party injured condoled the loss of his Remedy-Manuscript to such a Degree, that it wholly drown'd the loss of his Money-bag, which he would readily have compounded for the restoring of the Book, which the blank Paper in it excepted, would have been overvalued at Two Pence.

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3. The next recital coming within my knowledge, will give you a farther taste of this sort of foolish Credulity. The Servant of a Linnen-Dra- per had so great an Interest in her Mistress, as to borrow out of her Husband's Closet a Book of scribled Receipts, which through a Communi- cative kindness to one of my Maid-Servants, was entrusted with her to be Transcrib'd; but the Ma- ster daily covering in his Closet, soon missed what he so frequently eyed, and valued above all what was in it; upon a strict enquiry after the matter, his Wife soon qualified his uneasiness, by ac- quainting him where this valuable Treatise was to be found, who not long after accosted my Maid several days, being delayed for want of an op- portunity of Transcribing. The Person being tired by unsatisfactory Answers, resolved to dis- close to me the cause of his so frequent Confe- derences with this Menial of mine; and promi- sing to use my Authority with her, I did not doubt but I should oblige him with the return of his Book next Morning at a certain Hour, at which time precisely he came, when I did not fail to discharge my promise, in repossessing him with his Book, which he received from me with all the respectful Reverence, that Hands and Knees could express. You will not judge it improba- ble, that my Curiosity should lead me to inspect these Papers, which to the best of my Memory contain'd an excellent way to Stew a Calves- Head with Oysters, another to make Pritters, and some other pieces of Cookery; also a Salve for Chubblains, a Plaster for all sorts of Swel- lings, an infallible Drink for the Stone, a most certain Remedy against a Consumption, and all sorts of Coughs of the Lungs, being a Syrup jumbled of most strange Materials. Varieties of other Infallibilities of Remedies equally foolish I pass by, and shall only remark the intensity of
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of this Man's Belief, by his Mournful Countenance, whilst his Book of Secrets was absent from him, and to what Serenity he was restored upon his Reinstatement.

4. Suppose one of these Medicines were to be taken out of this Magazine of Health, and to be applied against a Consumption, Stone, or any thing else, the failure he would most certainly attribute to the want of some of the Ingredients, their too long being gathered, too much or too little being boiled, or to a hundred other Miscarriages, insomuch, that it would not give the least shock to the stability of his belief, which might not be singular in this Person, but general in thousands.

5. It would by many be Censured an Usury in a Person, that from the Expence of 30 or 40 Shillings, in the purchase of a *Gervard's Herbal*, or such like Picture Book, he should expect such an excessive Interest for his Money, as the value of knowing the faces and virtues of so many hundreds, or rather thousands of Plants doth amount to: And indeed, the Bargain of that Plant-Book would prove extraordinary Cheap, did what is contain'd in the hundredth part of it, answer to Truth in matter of Fact, which gives me occasion to make this Inference; that Herbals are fitter for Gardiners than Physitians, in furnishing the former with a Scheme of Figures of so many thousand Weeds there described, and consequently ought to be thrown out of their Manures, as Absorbers of the juice of the Earth, that should give Nourishment to their Esculents. However, to prevent contradicting of the Old Phrase, *Natura nihil facit frustra*, it may not untruly be affirmed, that the generality of Herbs growing in Fields, Meadows, and Hills, Nature seem'd chiefly design'd to bestow upon Beasts. It would therefore be an Employment fitter for
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Boys, that love rambling and lantring about Fields, and Hedges, to go upon Simpling, (as our Botanists do term it) than for Men, to make such needless, and not unchargeable Journeys, to the remotest Hills, and Woods, only to be acquainted with some New Faces of Plants, and take the Portrait of 'em, to be placed together in some bulky Volume, whose immensurable industry doth no more than equal those, that have taken the pains to abstract the Pictures of variety of Beasts, Fishes, Birds, Flies, and other Insects, in the manner of *Aldrovandus* and his Mimicks, who in that sort have passed their Lives in doing of nothing.

6. What respect is paid to *Hippocrates* and *Galen*, for their Services in Medicine, and to *Geber* or *Paracelsus* in Chymistry, *Dioscorides* may Challenge in Herbarry, he being by Profession an Old Soldier, and worn out by the Fatigues of Campaignes, with the assistance of his Crutches and Stumps, made a shift to Perambulate Woods, Hills, and Dales, in pursuit of Herbs and Weeds, with design to get his Bread by their Experimental Application in the Cure of Diseases, wherein he attained the success of *Gypsies*, that by foretelling the ignorant their good or bad luck, sometimes hit, and sometimes missed. Their casual hitting gives them Reputation enough, to persuade People, that their missing is occasioned by their misunderstanding the *Southsayer's* Predictions, or their own forgetfulness of what was told them, so that many do readily believe these *Gypsies* to be never-failing Prognosticators, not unlike *Dioscorides* his Herbal Performances, who by his green Remedies observing some Diseases disappearing, made no doubt of ascribing their Cure to 'em, and as boldly to hand the *Probatums* to succeeding Ages, which as confidently without the least Scruple, even to this day do receive them, not thinking

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that

that length of time, change and sparseness of Diet, alteration of the Air and Season, universal and particular Evacuations might perform the main part; the Truth of which seems by many instances to appear to me. That *Berony*, *Rosemary*, *Sage*, *Lavendel*, *Mother of Time*, *French Lavendel*, *Pyony*, *May-Lilly*, *Lime-Tree-Flowers*, and the like, upon the use of 'em by direction of the Learned, for many Days, Weeks, and Months, have failed in the Cure of Head-Aches, Tremblings, Swimmings of the Brain, Convulsions, and other Distempers of the Head, can best be attested by the Advisers; though it cannot be denied, that some of these Diseases have gone off in very few, upon the application of the foresaid Vegetables; but whether to be imputed to the virtue of these, may be matter of Inquiry: However, hit once and miss a hundred times, is a sign of no great Infallibility.

7. That a Million of Consumptives labouring of an Ulcerous Disposition of the Lungs, have been frustrated by a very long use of *Ground-Ivy*, *Maiden-Hair*, *Ysop*, *Scabious*, *Lung-wort*, *Coltsfoot*, *Sanicle*, *Golden Rod*, *Ladies-Mantle*, *Bugle*, and forty more, tho' us'd in all the forms and shapes, is sufficiently recorded in most of the Church-yards of this Island.

1. The Stone-grinding and Piss-driving-Herbs, as *Saxifrage*, *Maiden-Hair*, *Speedwell*, *Horse-Radish*, *Fenil*, *Perfly*, *Broom*, *Gromwell*, *Daucus*, *Butchers-Broom*, *Cicers*, *Winter-Cherries*, and the rest, are not much depended upon by those, that have made Trial of 'em for four or five Months successively, though now and then one or other, that hath fancied a great relief, doth revive their dying reputation. These and the like instances do aptly compare the practice of Physick to a Lottery, where one Fortunate Adventurer saves the sinking Credit

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dit of that Cheating Mystery, against an hundred blank Miscreants, by being proclaimed such by sound of Trumpet.

9. To *Madder*, and many other Vegetables is ascribed Opening, Stopping, Binding, curing of the Jaundice, removing Obstructions of all sorts, suppressing the *Menstrua*, Loosenesses, and all sorts of Bleedings, besides many other feats, that are contrary to each other. As for *Amulets* and other Transplanting and wonderful Deeds, they are appropriated to abundance of Plants, of which, and several Physick Golden Legends the Herbarists speak wonders, if you can believe them. As for my own particular, beyond forty or fifty Vegetables, tho' I have made Trial of hundreds of 'em, I find no great occasion for them, and therefore shall supersede taking any farther Notice of them in this place.

C H A P. II.

Of the Insignificancy of the Old and New Philosophy.

1. **T** Hings in Philosophy and Medicine, which we do not know, are beyond all manner of Comparison more than those things we do know.

From this Axiom I do infer, that it is highly incumbent upon all, that would endeavour the advancement of Physick, to make a farther inquiry into Diseases, their Causes, and Medicines to oppose them.

2. The greatest part of those things in Medicine, which we pretend to know, is conjectural, and uncertain.

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3. Many, if not most of these things, which we do peremptorily affirm to be *thus*, or *that*, to be caused by *this*, or *that*, or to cause and effect *thus* or *that*, are, or may be proved, to be false, or erroneous.

These Positions being only my particular Creed, whereinto the Weakness of my Capacity hath been wrought by thousands of instances, I shall undertake to offer only some few, the shortness of my purpose no otherwise permitting.

1. Natural Philosophy is propounded under Two Heads, *viz.* *Physica generalis*, & *specialis*; that is to say, General Natural Philosophy, and particular. The former expounds in general terms, what a Natural Body is, namely, That it is a thing extended, moved, or quiet, figur'd and so or so placed, situated, or posited. *Corpus Naturale est res quanta, mota, vel quieta, figurata, & taliter, vel taliter posita.*

2. What is all this but *Metaphysics*, namely, General Notions drawn from all particular Bodies? A Natural Body doth consist of Quantity, that is, Extension into length, breadth, and depth, mensurability, or divisibility into Particles, (it's much as one in the Original) of motion, or rest, of figure, and position or situation. Upon these five Topicks follows a very long Cant, and of little more signification than the Predicaments, or *Materia*, *Forma*, and *Privatio*. But it's a wonder Number was left out, since there is no compleat Natural Body, but doth consist of a definite Number of Particles; however it may be presumed, that Number is comprehended under Extension, *sc.* *Quantitas discreta*.

3. The *Physica Specialis* depends upon the application of the forementioned, to every *Subgenus*, *Species*, and individual Body, and by that you are to know, what any particular Body is, of what it doth consist, and how each is differed from the other.

4. What

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4. What found this modern Science of Bodies makes upon an Anvil, the following recital will inform you. A *Smith* being very sedulous in the management of his hot Iron, found himself much interrupted by the importunities of a begging Scholar, inforcing his Arguments for an Alms of a small piece, with an Harangue of his merits, arising from being a *Master of Arts* of I know not how many years standing, a *Doctor in Philosophy*, embroider'd with *Latin, Greek, Hebrew*, and abundance of other Giblets of Learning. The *Smith* to free himself of all this Impertinence, asks what that red hot thing was, he held in his Tongs, what it was made of, and what difference there was between that and Copper; to which the Beggar replied, it was Iron, a Metal or a Business dug out of the Ground, that will melt, and can be hammer'd; and so is Copper, infers the *Smith*: Ergo Copper is Iron. No Master, saith the Mendicant, there is a vast discrepancy between them in their insensible Particles, which are of different insensible Extensions, insensible Figures, insensible Positions, insensible Motions, and insensible Immobilities. Ergo, then saith the black Opponent, no two Bodies can be alike, two drops of Milk, of Water, of Wine, or any liquid may be insensibly different. Thou art a most insensible Philosopher, a Man is not a Horse, a Sow is not an Elephant, Wood is not Cheese, and so of all others, because their Particles are of various insensible Figures, Positions, &c. The most subtil Particles of the Forge Fire, and the insensibilities of this *Arts Master*, had by this time fermented *Vulcan* into a torrent of Maledictions, crying out, you are a Cheat, to defraud the impotent Poor of what they may justly crave from the Charity of all Men; a lazy, sloathful, unthankful Knave, enjoying the Fruits of thy laborious

Mother Earth, without returning the Gratitude of a days Plowing, or Dunging, which you are made for; an incorrigible sturdy Beggar; See how the Sleeves of your totterdemalion Gown are cram'd, from the Elbow to the Ground with Pie-crust, and pieces of Roast-Beef, and what's here in the bottom? a couple of Silver Spoons, two lac'd Handkerchiefs wet, as if newly stolen off some Hedge. You pilfering Dog, disrobe that Friar Bacon's Livery, off with your square Pancake Bonnet, and put on that Old Coat of mine there, and this old Hat; blow the Bellows, and I will teach you an Art beyond all your Master-ships idle foppish Arts and Sciences, that shall get you an honest Livelyhood, or else away to the House of Correction, that will soon drive out your insensible Particles, and make you sensible of what it is to Beg, Cheat, Pilfer, and Steal.

5. To what degree of satisfaction this Globular sort of Philosophy, pretending by its insensibilities to explicate the Principles, Causes, and Affections of Natural Bodies, doth superate the old Pedantick Sophistry of matter, form, privation, and the four Elements, together with their assigning the effects of Natural Bodies to occult qualities, may justly be inquired into, since the answer is equal, that such or such things are caused by occult Qualities, or by insensible Particles, of insensible blind Figures, and unknown Positions. However, both the Globular, and Peripatetick Philosophy afford matter sufficient to Chatter, cavil, and Trifle away the Flower of a Man's time, as if design'd only for an Employment to divert from Idleness and Debauchery, not unlike sending Children to School, to prevent them from Carts and Coaches in the Streets or High ways. Those do properly enough come within the saying of *Salust*, *Vitam silentio veluti pecora transeunt*; especially when continuing in an University, and possibly

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bly in a Fellowship, till their Bodies are grown rusty with sloath and Laziness, and their Head stunn'd mouldy with gray Hairs; whose Studies indeed ought to have been determined in Seven Years, were it only to quicken their Industry, and make way for other indigent Students to succeed them. A Peacock in all his gaudy Plumage, is a Creature less stately and proud, than a Master of Arts treading to the Schools in his Formalities; and though Homage be paid him in his way thither by Undergraduates, and Bachelors, his refin'd Manners will scarce allow his Mastership to touch the Angle of his Bonnet. *Clarissime Magister, quare rides? Rideo, quia Magister sum.*

C H A P. III.

Of Corporeal, and Incorporeal Philosophy.

AFTER all these Vanities, it cannot be denied; but that many excellent and useful Discourses may be rais'd from the Peripatetic Philosophy, and that the Cartesian or Mathematical, is extraordinary ingenious, and well enough put together; there only ariseth this Inconvenience from the latter, that the principles are not so consonant to Sacred Writ, (and not improbably may start up Atheism in some depraved Phantries) being wholly Metaphysical and Imaginary, depending upon mental Terms, Ideas, or Notions in the abstract, as *Quantity, Rest, Figure, and Location* are, unto which this Philosophy pretends all Bodies ought to be answering, and obedient, so that its purely Mental, or Mathematical; whereas a Science of Bodies ought to be handed to the understanding by the External senses, or by means of sensation, or such impressions, which Bodies

make upon the External senses; for its possible, those *Ideas* we conceive in our minds *a priori*, may be repugnant to the impression of Bodies made upon our External Senses; for Instance, They imagine this proposition to be Mathematical, (though by what *postulata*, or axioms of *Euclid* it's demonstrable, I am to seek) *viz.* that Motion cannot be lost, or become extinct, but that as much of it as is lost in one Subject, must be imparted to another; which our Senses do contradict, by perceiving that when two Bodies are moved Diametrically one against the other, the Motion of both is extinguish'd, (*contraria sese mutuo tollunt*) and not communicated to the Air farther, than to a small circumferential distance. Moreover this sort of Philosophy requires very complex apprehensions or thoughts to conceive its institutes rightly, so that they give a great deal of *embarras* in their application to particular Bodies, and in the explication of their immediate causes, properties, effects, and affections, that may result from them. Wherefore I hope it may not be construed Presumption in my indeavours, though in no manner pretending to be positive, or to teach, but rather to be taught, if I do not set down for my own use succinctly some few *Postulata*, and Theorems of the chief part of Natural and Metaphysical Philosophy, that may be of Importance to Theology, and the faculty of Physick, and otherwise give my intellects matter of speculation, setting for the present only aside all former Notions in that part, for so much as I shall discourse of here.

1. I ought first to tell you, That by Corporeal Philosophy, I mean a Science of sensible Bodies, or quantitative Beings, that do actually move, or probably may or can move our External Senses; bycause we do, or can know (*noscere vel scire simpliciter, prima & sensibili notione*) nothing but

but what is let into the understanding by the External Senses.

2. A Body is that, which primarily, *per se*, and immediately doth, or probably can move or affect our External Senses, which is, or can be nothing but quantity, or a quantitative Being.

3. The first division of a Being is into Increate, and Created. You cannot properly say a Being is a *genus*, to Increate, and Created; because *Genus prædicat de pluribus speciebus*, or *specie differentibus*; but an Increate Being, which is but one, cannot be said to be a *species*; besides, *Genus est dignius speciebus*; but God cannot be said to be *seipso dignior*.

4. A Created Being is not a *Genus* to these four *Species*, but can only be divided into four, or five, if you add Place or *Locus*, viz. Angels, Rational Souls, the Earth Chaos or Universal first quantity, and Divels; all which four the Sacred Pages do expresse to be only Created; ** all other Beings are there said to be Formed, consequently, the Heavens are not Created, but Formed, as the 7 and 8 Verses of the First Chap. of Genesis declare.

5. Place (*Locus*) is divided into Increate, Created, and Formed, the First is peculiar to the Creator, The Second to Created Beings, and the Third to Bodies, which only can be term'd to

** Created strictly implies a thing educed out of nothing. But largely implies a thing formed, made, or produced out of a previous matter, or another pre-existent thing, as in Verse 21. Chap. 1. Gen. God is there said to have created great Whales, and all Fish and Fowl; that is, he made or formed them out of previous created matter, viz. the Chaos or Earth; so that formation, making and production, expressed by the words let there be, are all synonymous, implying the raising of things out of previous created matter.

be Formed ; the Increate place is unbounded, and has no Limits ; a Created place is Limited by the Increate Being ; and the Formed place, by a Body, or Bodies. The Essence of Angels, Souls and Devils, consists in the Understanding and Will, which are both Limited by the Creator, which Limits are called their Places ; wherefore Divines say, those Created Beings are Circumscriptive, that is, are Limited to places, or else they would and might be term'd Gods. This Paragraph if thoroughly consider'd, will Lead us into a great Number of true Notions of Angels, Souls, Devils, and the Earth ; but this is not a convenient place to enumerate them in farther, than to insert a few instances. Angels, separated Souls, and Devils can act, and have acted, in and upon Bodies ; but Bodies cannot act upon them ; they can only be said to be Active, and Bodies passive. Angels and separated Souls can, and have formed humane Bodies out of the same Materials, God did originally form Man ; not out of the Air alone ; for that is impossible ; bycause Air alone can make only a resemblance to humane Bodies, as we oft perceive resemblances of that kind, and of others in the Clowds ; but they cannot have Organs to walk, speak, eat, drink, &c. Wherefore as Angels have formed humane Bodies, so for a time their essences, which consist in understanding and will have absolutely informed those Bodies, as rational Souls do inform the Bodies of Men, wherefore it seems an error to me, when some Scholars do say, that Angels have only formed humane Bodies out of the Air, when they have assum'd them ; by cause they imagine, that an Airy humane Body is soonest formed, and soonest dissolved again ; as if it were not as easy to the Power of an Angel to form a real humane Body in the same time, as a fictitious apparent humane Body, which I have proved before its impossible. 2dly, Separated Souls can, and have formed humane Bodies like

like their own former deserted Bodies, and have assum'd or reformed them for a time, and have appeared again on Earth to several Persons, to discover some signal or extraordinary Fact, or to declare some signal thing, that is or ought to be done, and afterwards disappeared again, by dissolving those real Bodies into the same Elements (or rather *Elementata*) whereout they had formed them: But 3dly remember, that *quicquid movetur, movetur ab alio*; wherefore it is, the Creator doth either immediately move their Wills, or mediately by giving their Wills a Power of moving; for the Power of acting upon Bodies is only in the Wills of created intelligent beings. 4thly, The Power of acting in Angels and separated Souls hath mostly been limited to forming humane Bodies as being most worthy of them; but not to forming Beasts, or any other Species of Animals, or natural Bodies; whereas on the other Hand, the Power of Devils, for the most part doth not extend to forming humane Bodies, resembling those Bodies that had been informed by Pious Souls, as being unworthy of, and indecent to Wicked essences; Though most commonly their Power did only extent to forming of Bodies of Beasts, and other inferior Animals, as Reptils, &c. 5, As an Angel and separated Soul, are limited and bounded in the extent of their Wills in immaterial places, so likewise they are limited and bounded by material places, as oft as they are present in the univers. Now to imagine, that the Wills of an Angel or separated Soul can be bounded in a lesser place, than the extent of an humane Body, is incongruous; bycause contraction or crowding (as it were) of an Angel or separate Soul implies an imperfection; and in regard that God hath in his Wisdom decreed the common extent of humane Body to be most fit to bound, limit, or comprehend the Will of a rational Soul

Soul, it seems most apparent, that such an extent is most fit to bound, limit, or circumscribe the extent of Will of a separate Soul, and Angel. Wherefore to me it seems a very improper common saying of young Scholars, that millions of Angels can be contained or circumscribed by the point of a Needle, which I have shewed is impossible. On the other hand, Devils may crowd or contract themselves into the compass of Atoms, to whom as being most Wicked, and most deform'd the worst of imperfections are allow'd, as I express'd before contractions of Essences are in that sense. Wherefore we do read in sacred History, that legions of Devils have possess'd a wicked humane Body, but never that legions of Angels have possessed a Pious humane Body.

6. If an Angel, or separate Soul, when present in the univers, are bounded in the extent of their Will or Power, by Circumscribing Bodies or a Corporeal place, we cannot think, or say, that an hundred Angels, or separated Souls can be contained in the extent of their severall understandings and Wills in a Room no bigger than a Closet; bycause there must be a penetration of those corporeal places that Circumscribe the extent of their severall understandings and Wills; besides I may in a sort of a comparative sense say, there must be a penetration of the severall extents of their understandings and Wills.

7. The great Power of God is by us chiefly (I speak *ad caput humanum*) discerned to be in his Almighty Will, express'd in the 1. Chap. of Gen. in these Words, *let there be*, that is I will, and instantly it was so. In like manner God hath granted to the Wills of Angels, and separate Souls a derivative Power in their Wills, to which all Corporeal Bodies are forced to yield an instantaneous Obedience; and therefore we must not think strange, that they can, and have acted such great

great and wonderful Acts by their great Power.
 8. If you do give your assent to the premised discourse, you must also grant, that an Angel, and a Rational Soul cannot be in the same Body at the same time; for then there must two forms in one Body, and a sort of penetration, of the extents of two understandings and Wills, all which is very incongruous; so that an Angel, that is attending every Man, as I have explain'd in another place, is only near or next him, to assist him in his voluntary Actions, by inclining his Will and passions to good, and averting them from Evil, through disposing of the *Ideas* of external objects in such a manner, as they by moving his external senses, shall by consequence move his Will. On the other hand, a Devil that can, and doth deceitfully and maliciously contract and croud his essence into an Atom, and seat himself in or near the chief Mansion of the Soul, by perverting of his understanding and will, not only by his internal presence, but sometimes doth pervert the true appearance of ideas of external objects into false, and so deceitfully leads and Prompts a Man into Evil, when he (*viz.* the Devil) acts from without.

6. Sensible implies an active, and a passive signification, *viz.* that, which actively doth move the Sense, which is an External object; or that which is passively moved, or doth receive and suffer the motion of the external object, which is the Sense, so that the external object, and the sense are both called sensible. Object is the external Body, and Subject is the Sense.

7. Science is not always true and certain, nor of a true and certain Subject, though an *Universal*; bycause the truth and certainty of an *Universal* dedends upon the truth and certainty of *Singulars*, which sometimes do move the Senses falsely and uncertainly, and at other times truly and certain-

ly, though at most times certainly and truly. Wherefore an *Universale* (which is the Subject of Science) being only true and certain *æd mai* so that, a Science can only be true for the most part, and not always.

8. An *Universale* is a common *Idea*, impressed upon the intellect by two singulars; or by three, or more, which makes it an *Universalior*; or by all, which render it an *Universalissimum* (and only peculiar to God) of which its impossible for the understanding to have an adequate, true and certain *Idea*; for though the Intellect may receive a common *Idea* of many Horses and Cows in one Country; it cannot of all Horses and Cows in the universe, which possibly and actually are different in the East or West *Indies* from those in Europe or *Africa*.

9. Simple Truth is the Conformity or exact and adequate agreement of the Simple *Idea* in the intellect with the Simple *Idea* impressed upon the internal common Sense, and the conformity of that *Idea* with the *Idea*, made upon the external Sense, and the conformity of that *Idea* with the external thing itself that made the first impression. In short Truth (as to us) is the conformity of an *Idea* with the external thing, that made or caused it.

Compound Truth is the conformity of several *Idea*'s one with the other in the Intellect, and the conformity of several compound or complex Operations in the intellect one with the other, be they mental Sayings, Inferences, Conclusions, &c.

10. Certainty implies no more than a confirmation of Truth in the intellect, whereby it becomes Infallible, or beyond the possibility of being deceived. Certainty must also be simple or complex. It follows hence, that all certainties are Truths, but all Truths are not certainties as to us; because a thing may be true in itself in having a Power to make an *Idea* of itself, and yet we cannot
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be always certain that it is a true *Idea* of the thing.

11. The first simple true and (*quasi*) certain knowledge, (*notio* not *cognitio*; for that implies a complex *notio*) is *sentio dolorem*, I do feel Pain, not *cogito*, *Ergo sum*, bycause that's a complex knowledge, or *cognitio*, and perform'd by several Operations of the Mind; but more of this will be said hereafter.

I said *quasi*, bycause a Man is not always certain he feels Pain; for a Man doth very oft phantasie he feels a Flea biting him, when there was never a Flea near him; so that a Man can scarce be absolutely certain of any thing. We are absolutely certain there are second Causes, and consequently we are absolutely certain there must be a first Cause, which is God, who is the only, and first certain being; he is the first of all Beings, Truths, Certainities, Knowledge, &c. For there must be a First, which is the immutable Stander of all others. We can only be absolutely certain of God's Attributes, bycause they are immutable; all other Beings or things are mutable in their Properties, Affections, or Accidents; so that we cannot be absolutely certain in our knowledge of them. If you object, that essences are true and certain in their properties; and therefore our knowledge must be absolutely certain of them; the consequence is denied; bycause Essences, as to themselves are ever absolutely true and certain; but that cannot infer, that our knowledge of them must be absolutely certain of them. This may admit of a very long sequel of objections; but the conclusion will amount to little more than of *lana caprina*, and therefore I will leave it there.

12. *Physica* signifying *Naturalis*, where you must *subintelligere Scientiam*, which both together express a Natural Science, and is defined by Peripateticks a Natural Science of natural Bodies, which

which appears very improper, to make the *Genus* in a definition to be the same words and things of the *definitum*; for a Science cannot be a *Genus* to a Science; besides, a *Genus* must be a *magis Universale*, than the thing to which it is a *Genus*. A Body is (they say) a Being, that doth consist, or is made by *Privation*, or absence of a Form out of *Matter*, and afterwards joyned to *Form*. What an incongruity is here! A Being is made out of *Matter*, which is nothing, (as I shall make plain afterwards) by nothing, which is *Privation*, that is absence, or non presence of a Form, joining to *Matter*, that was nothing, a Form that was nothing also. These are the three Principles of a Natural Being, which is made out of a Mother *materia*, by a Father *privatio*, not in being, and joined with her Twin Sister *Forma* at the same instant; for as soon as *Matter* is made, it must have Form, for it cannot subsist without her; and therefore they say, that *Matter* and *Form* are incomplete Substances or Subsistencies, a plain contradiction in words; for a Substance or Subsistence implies her self complete, and can, and doth stand alone, or *per se subsistit*. However they tell us, they are half substances, and declare that *Materia prima* is *nec quid, nec quale, nec quantum*, that is, she is neither Substance, nor Quality, nor Quantity; then follows, if neither Substance, nor *accidens*, it must be nothing. The same may be said of *forma*; she is neither *quid, quale, nor quantum*; therefore nothing. *Privatio* is scarce worth speaking of, that being a Term of Art belonging to logical opposition, *viz. oppositio privativa*. But what is that *Matter*, whereout a formed Essence or Being is made? for every word is a *signum*, and refers to a *signatum*; wherefore *des Cartes* tells you, the *Matter* of a Body is quantity, all Bodies being made thereout, and the
Form

Form, that doth specify or distinguish Bodies, are Rest, Motion, Figure, and Position. But I cannot think, that either Peripatetic, or Cartesian can tell me, what Matter, what Form, or what Privation, an *Ens* or Essence is made of. Here you see is vanity in abundance, what's *Corpus*? this no Peripatetick can inform me. What is *Naturale* then? It must be answer'd to be *quod sit e natura tanquam principio*, Aristotle defines *Natura* to be *principium motus & quietis*, &c. then a Natural Body must *fieri e motu & quiete*, i. e. *Corpus naturale est corpus motum & quietum*. Here are now four *Principia Corporis Naturalis*; *materia prima*, *forma prima*, *privatio prima*, and *natura prima*. Can *natura*, (which must be either a Substance or an *accidens*) be the *principium*, or *causa prima* of two peripatetically contrary accidents, as they say *motus* and *quies* are? *Motus & quies* in the said definition, must either be taken *conjunctim*; bycause the word *es* joyns them; or *divisim*, but then it ought to have been said *principium motus vel quietis*. If *conjunctim*, then *corpus naturale* may and must be said to be *motum & quietum* at the same time; if *divisim*, then *Natura* must make two *principia* in her self, the one of Motion, and the other of Rest. By *Natura* is meant *Natura Naturans*, or *Naturata*, not the former; bycause Aristotle could not have believed, there was a God, if he held the World to be Eternal; for then there must have been two Eternals, and first Causes, whereof the one must have caused one *series* or link of *causata*, and the other another.

13. The *Physica Generalis* Treats of the Essence and Properties or Affections of sensible Bodies in general; the *Specialis* in particular, viz. of those that are simple, (or less simple) as the *Elementata*; *Aether*, *lymphæ*, and *Earth*; and of all Bodies compounded out of them; as *Fire*, *Stars*, *Animals*, *Vegetables* and *Minerals*. I ought
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here to advert you, that it's not my purpose to Treat Methodically of the *Physica Generalis*, but *Sparsim* or diffusedly in Theorems, and of *Metaphysica*, as also of *Physica Specialis*, much after the same manner. 2dly, To save the trouble of using and repeting the long Words of a sensible quantitative being or body, for the most part, as oft as I do express the word Quantity, I do mean a sensible quantitative Being.

14. *Nihil est intellectu. quin prius fuerit in sensu*, is only to be understood of simple Idea's, and not of complex or compounded; bycause the intellect can form Millions of compounded Idea's by a complex or compounded thought (tho' made or compounded out of single and simple ones, that were impressed by the Senses upon the Intellect, which are therefore properly called *entia rationis*) *rationaliter*, and specifically different from all sensible Idea's.

15. All immaterial Beings can be joined, or *quodam sensu* united to and with material Beings, which Divines term assuming of Bodies, and in this meaning Holy Writ informs us, that Angels have been join'd to, or have assumed Humane Bodies, *i. e.* Bodies formed out of the *elementata*, *viz.* Air, Earth, &c. like to humane. Devils have entred, that is, joined themselves with the Bodies of Swines; but Souls are properly said to be united to their Bodies, wherein, or in which meaning they differ from Angels, who can and do leave those Bodies at will or pleasure, which a Soul cannot: But how far, or in what meaning God is said to have spoken to *Moses*, as having assuming the Body, or shape of Man, I leave to Divines; and it is hence the Papists paint God frequently in the shape of an old Man, tho' very sinfully against the Second Commandment.

16. The *Calum Empyreum* from *πῦρ* fire, signifies no more than the fiery Heaven, which is the

the *Aether*, that is all fire, perpetually most violently moving, consequently perpetually burning, flaming, giving light, and shining; but some foolish Papists do believe, that the said fiery Heaven is either the Seat of immaterial Essences, or at least a *Purgatory*, both being impossible, that a material Fire should be the ordinary residence of Angels, Souls, or Devils; or that they should be affected with it, or purified by it, as they pretend the business of *Purgatory* to be; tho' the most the more understanding Papists do make of those and such like Notions, is, that they are *pia fraudes*, and therefore ought to be believed by all of 'em. 2dly, That most immaterial Beings can, or ought to have been, contained by a material Place is evident by the 15th Paragragh, but only for a time; which Assertion ought to grant (*humani captus gratia*) that all immaterial created Beings have an immaterial extension, some more ample, others less, tho' limited, or else it cannot be supposed that those immaterial Beings can be joined to, or circumscribed by a material Being, and a material Place: This seems to me a very useful and necessary *postulatum*. Hence it follows, that an Angel can be joined, limited to, or circumscribed by a material least, and by the biggest gigantean humane shaped Body; the like may be said of Devils. 3dly, That no singular Angel or Devil can be in two Bodies, or material Places, at one and the same time; bycause their Essence consists of Understanding and Will, which being limited cannot be in one immaterial or material Place, and in another at the same time.

17. *Actus praecedit potentiam in sensu, & potentia praecedit actum in intellectu*, but in various meanings. Nothing can *simpliciter*, or *prima notione*, be said to be in *potentia*, that has not been in *actu* before. A Whelp soon after its puppied ought not

to be said, it has sight in *potentia*, because it may so happen, that it may or can never see. Neither can any thing be said absolutely in *potentia*, but only in a probable *potentia*; bycause, for instance, a man that has seen, cannot in that meaning be said, when he is in sleep, that he hath sight in *potentia* absolutely; for it may so happen, that he may or can never see again, by reason of a disease, or death hapning to him in his sleep; so that it ought only be said in a probable *potentia*. Here may be objected, that a Man having a stick in his hand, hath the *potencia* or power of striking, before he doth actually strike. I answer, you cannot perceive by your Senses, that a Man can strike, before you have seen, heard, or felt him strike; for it may so happen, that his hand is paralytic; but when you have seen or felt him strike, then you can say, he has a *potentia* of striking, tho' but a probable one, for it may chance, that his hand (as I said before) may become paralytic, or its mobility may be taken away by a wound, or other accident. You reply there must be necessarily a preparation, or predisposition of Muscles, Tendons and animal Spirits in the hand or arm before he actually strikes, which makes a *potentia*. I answer, you cannot perceive by your Senses, that a hand or arm hath Muscles, Tendons, and animal Spirits, before you have seen or felt them move, no more than a Watch-maker can tell, that the Watch he has lately made can go, before by tryal he doth see it go. But as to the Intellect, its quite contrary; bycause it can form Idea's of an adequate predisposition in the *potentia* of a Being before, which must necessarily precede the *actus*, that also must necessarily follow, bycause the *potentia* or predisposition was adequate to such an *actus*; and therefore must precede. In consequence of this Paragraph, *there is nothing that has a real Essence, but must have a real existence;*
and

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and there is nothing that has a real existence, but must have a real essence; for you cannot properly say, a Man contains a potential essence in the propagating an actual essence of a Son, for then he is become an actual Father, and at the same instant the Son is become an actual Son. On the other hand the Intellect can form or consider a potential essence, without an actual existence in the intellect; but all these sort of Notions must be taken in various meanings.

18. Words are only expressions by the tongue of Idea's, Images, Pictures, or Representations of Bodies, made upon the intellect by the external Senses, or external sensation caused by external Bodies; so that we cannot speak, or *simpliciter*, or *prima notione*, think of any thing but what is a body. You object, you can speak or think of an Angel; but what can you speak or think of him? you answer, that you say, or think, he is an incorporeal Being, that is to say, he is a Being, that has no Body; then it follows, you must speak or think what a body is (which you only know by your external Senses) before you can say or think, that there is a Being, that has no body. The like Answer serves to the speaking, or thinking of an *universale*, from your speaking or thinking first of *individuals*, or singulars, that must be sensil.

19. *Number is not quantity*, wherefore its very improperly called a *quantitas discreta*, in regard the extension of number is not into length, breadth and depth. Neither can number in any wise be termed quantity; for the words of great and little are only applicable to quantity, as appears in the asking, how great or how little is this or that quantity or extension? Whereas in respect to number, you ask how many, or how few are such or such quantities or things? Now you can never reduce many and great under one

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head, or make them be the same thing; so that number or numerability, is no otherwise belonging to quantity, then continuity, mensurability, mobility, divisibility, and locality, all which you cannot say are quantity or extension into length, breadth and depth, but intellectual properties or affections of quantity, which the understanding doth appropriate to or affect quantity with, being thereunto moved by the Idea's the Senses carry to it from the several appearances of quantity to the Senses; so is numerability a property or affection, which said properties or affections do all follow one another in a stream, or successively; for quantity must be continuous, before you can imagine it to be divisible; bycause if it be contiguous it cannot be said to be divisible, in regard it is actually divided. 2dly, Quantity must be moved, before it can be divided; bycause it is by motion, that any thing is divided, as will be said in another place. Now, when a thing or quantity is divided, it cannot be divided into number, which plainly infers, that number or numerability is not to be termed a quantity, but one of the secondary properties or affections of quantity. The primary follow one another in order thus, continuity, mobility, and divisibility; as for mensurability, location or locability, and numerability, they are secondary affections or properties deriving from the primary, viz. mensurability ariseth from continuity; bycause no quantity can be measured but what is continuous, or *quatenus* continuous. Locality and numerability arise from divisibility; for as soon as quantity is divided into parts or particles, or contiguities, internal location must follow, which is a circumscription of one particle by another; likewise numerability must follow at the same instant, bycause quantity cannot be divided (as I said before) but into number, or numerable particles. From external location

location quantity seems to receive all its primary and secondary properties (in a particular meaning) and existence, and without it they can only have an essence in the Intellect; neither can you know they have essence but by their existence, moving your external Senses.

20. Nothing can be divided, that is, distinguished, otherwise than by properties or affections; therefore the dividing of quantity into *continuum* and *discretam*, is only an accidental division of the properties of quantity, and not of quantity it self, or its essence; the essences of all things being accounted indivisible; for if you in your Imagination take away longitude, latitude, or profundity from quantity, you destroy its essence as much as by dividing the humane Soul from the Body, you destroy the Man. So that the essence of all things in the Universe is but one, which is quantity, that is indivisible in its essence, and only divisible and distinguishable by its properties, affections, or accidents; wherefore one quantity differs from another only in rest, motion and location; as for figure, that is only an effect of location; for from the location, or placing of the particles, figure doth arise.

21. Affections are to be understood either passively or actively, passively are those affections, that the intellect doth affect a thing, body, or quantity with, which in this sense is passive; actively are those affections which the body, or thing, doth affect the Intellect with. Before I leave this subject, I ought to answer a material Question, arising from external location, which is a circumscription of one quantitative Being by another, that is external, which latter (as I said before) seems to give its existence to the former, viz. What external extension doth circumscribe or contain the World? its answer'd previously, that in *in omni genere oportet, ut sit quiddam pri-*

mun. Wherefore I do assert, That the World which is an extended Being or quantity is circumscribed, or contained by the most transcendent extended Power of the Almighty God, who doth circumscribe the World by his Power, which is so transcendent, that it exceeds the capacity of all our Senses and Understanding, which transcendently extending Power, as soon as he is pleased to withdraw, the World must of necessity return to its first nothing, out of which it was created. Whence follows, that God's preservation of the World is as necessary for its continuance, as his Creation for its first Being. No Reply can be made to this Answer, without the greatest Impiety, or Blasphemy. That there was but one World created is evident from the *Series* of the Declaration of *Genesis*. Lastly observe, that Creation is *ex aliquo immateriali*, but *ex nihilo materiali*; and therefore Creation is not repugnant to the Axiom *ex nihilo nihil fit*; but more of this in another place.

1. It will not be amiss to explain what is meant by *Principium*, or *Principle*; namely that, out of which all natural or sensible Bodies are first and Originally made, and into which, they are at last Reduced at their Dissolution.

2. I conceive, That a Principle ought to be always the same and constant, and not subject to be mutable or chang'd at every turn.

3. The Principle or Original of all things, in *Unusquoque genere vel specie*, for so much as it is a Principle of, ought, or cannot be more than one, no more than the World can have two Creators, or a Man two Fathers.

4. Essence is being, and being is Essence, and Essence is to be; wherefore the French Name an Essence *un Estre*, in the infinitive Mood, and the Germans and Dutch, *das Wesen*, and *het Wesen*, in Latin an *Esse*, and in Greek *ἔσθ' ὄν* for *ἔστιν ὄν*. To say

say *illud est*, means *illud esse*, consequently to say *est* means *habet essentiam*, and *habet essentiam* means *est*. If I ask you what is *est*, your answer is, that which has an *Esse*, or an Essence or being, all this, is *idem per idem*, and they are Synonyma's, so that we had better use the Word *est*, as shortest, and say, that Essence is whatever you can say *est*, of, or unto; for Instance, what is the *Est* of Fire? You Answer, it is a most Violent motion, destroying all things; which being only a property, I then may assert elsewhere, that the Essence of all things is only their first Property. But since you cannot say *est*, it is, without it be Existent; and you cannot say it is Existent, without it be Existent in a external place, out of your Intellect; nor in your intellect, unless it has an Internal place there; I do say, in reference to that meaning, that an *esse* is infinite, and consequently Eternal as being in the Infinitive, or Infinite Mood; for when doth an *esse* begin? you say when it begins to be an *esse*, that it cannot; bycause, if it is an *esse*, it is past the beginning. Where doth an *Esse* end; you say, where it ceases to be an *esse*, than it must end into nothing, and consequently it must begin from nothing; consequently all Essences must be Created, which they are not; besides God hath an *Esse*, but it is Blasphemy to say that God is Created out of nothing, your Answer must be, God is Infinite, and hath neither beginning nor ending, and his Essence is the first Essence and eternal; all second Essences are finite, and not Eternal. It may be Replied, That this latter Assertion wants proof; but this follows, that all Second, Third or Fourth Essences, are Second, Third or Fourth perpetuities, and Infinites. After all, these are only *Sophismata's*, whereby *Aristotle* deceiv'd himself, and ought in no manner of ways to be Discourfed of, nor search'd into, but refer'd to *Credenda*. 2dly, I say, That *Essence*

is only part of a principle, or a *Principium partiale* of all beings immaterial (*Deo Excepto*) and Corporeal ; bycause without the other parts (which make up the *Totum Complexum*) she cannot by her self alone, Constitute, or cause any being, viz. without Existence and place. Essence implys only a possibility of Existence, signifying an Actual Essence ; and therefore School-men use to say, Essence, when she is *extra causas*, (or rather *causam*, which here is possibility) she becomes Existence. Essence, is a possibility in the intellect ; but Essence *in re*, is actual Existence. So that a *parte rationis* possibility, as a *Simplex ens rationis*, abstracted by the Intellect *Simpliciter*, from any thing that's real, by means of a simple *Idea*, is preceding to actuality ; but a *parte rei* actuality must precede possibility ; what Essence is farther, or in what manner she may be farther apprehended, the next Theorem will declare.

5. What we know (by means of a simple sensible *Idea*) a thing or being is, that it is (*quantum ad nos*) what we do not know a thing to be, we cannot say its any thing but nothing as to us. There is an external knowledge that's derived from external Beings, or *res*, by the *Idea*'s impressed upon the Senses. An internal knowledge is what the Understanding knows in its self, without having any respect to an external object, by forming *Idea*'s in her self. We can only know God by a complex *Idea*.

6. Essence (in another respect) is only a first property. You object by Query, That a property implies to belong, appertain, and be appropriated to some thing, what therefore is Essence a property unto ? Its answer'd, essence is the first property of our thought, bycause it is our Understanding and knowledge doth appropriate it to what we know, or think it is ; so that, I say, there are (in one respect or sense) no properties, that

that issue from things themselves, but from our understanding, appropriating, affecting, attributing, or causing to *accidere*, or befall to a thing; wherefore I said elsewhere, that property, attribute, affection, quality and *accidens* are all synonymous here. Peripatetics assert, that essences are invisible and incognoscible; and therefore as to us we cannot think or say, they are any thing; but for that reason, they do tell us, that Essences are only cognoscible by their properties; and what are those properties, but what the mind doth appropriate to them, being thereunto moved by the *Idea* of the essence moving the Intellect. Wherefore Essence can be nothing as to us but a first property, in respect only to the Understanding.

The notion of singulars, particulars, or *Individa*, is primarily or primitively proper to, or a propriety of the external Senses, and secundarily or derivatively (or *per continuationem*, or *propagationem*) of the Intellect, as the notion of an *Universale* is peculiarly proper to the understanding.

Cartesius affirms, that the first and most certain knowledge of a man, is *Cogito, ergo sum*, tho' not at all well made out by him. What does he mean by *Cogito*? it must be either *mente concipio*, *nosco*, *scio*, *sum conscius* (the *verbalia*, of which are *mentis conceptio*, *notio*, *scientia*, *conscientia*, which last word he seems to use most here) which are all synonymous, importing an *actio simplex* of *mens*, or the understanding, whence *mentis discursus* (which properly is *intellectus*, *ab interlegendo*, or *interligando*, bycause the understanding doth read and behold the *Idea's* and their differences) is a most complex action, running from one compounded or complex action to another; and *cogitatio* is a frequent action quick together, of the mind upon an internal object, and consequently must be complex also; but after all he seems to tell us, that by *cogito*, he only means *scio*, or *consciussum* (i. e. *mente*
teste

certissime scio) that is to say, unless I certainly know a thing in my mind first, I cannot certainly know it by Senses; for he saith, I can see, hear, and walk in a Dream, which when I am awake, my mind thinking or thought informs me otherwise; but when I do actually and really see, hear, or walk, my thought is my certain witness, that I do most certainly see, hear, or walk; so that I must first think, know or be conscious within my self, before I can certainly say *I am*, meaning existent, that is, I am in a place. This whole matter imports two particulars, the one is, which is the first notion or knowledge, and the other, which is the most certain notion. He asserts then, that the first and the most certain action of the understanding or notion is, *cogito* I think; the second, or next to the first, and equally certain is, *sum* I am. Both these first and second and most certain notions he forms into an *Enthymema*, or a defective Syllogism, which to make perfect doth require the major proposition, which is left to us *sumus*. *Cogito ergo sum* is the Enthymeme; the perfect Syllogism is in *Davii*

Omne quod cogitat, est.

Ego cogito;

Ergo ego sum.

negantur major & minor; the conclusion must fall of it self. *Cogito ergo sum cogitans*, is a true though a very idle consequence.

The reason of my denying of the first Syllogism is, bycause to say only, that a Man thinks, without being able to say what it is he thinks, is not thinking; for a Man that thinks, must think of something, he cannot be said to think of nothing. Must it then follow, because a man saith he thinks of nothing, he must therefore have an essence and existence.

The Syllogism must be thus formed to express *Cartesius* his intention. *Omne quod cogitat suam essentiam,*

sentiam & existentiam, habet suam essentiam & existentiam. Ego cogito meam essentiam & existentiam; Ergo ego sum ens existens. The point in dispute is this, whether *cogito essentiam & existentiam* be the first, and most certain thought, or secondly, whether bycause I do think I have an essence and existence it must necessarily follow, that I have a Being existent, or *habeo, &c.* 3dly, Whether that *enthymeme* is the first and most certain notion of the mind. I would scarce lose so much Ink and Paper about this trivial matter, only this great Author tells us, it is necessary for us first, and certainly to know, that we have a Being, before we can pretend to know any thing else; and besides it may give a man a little diversion in the perusing the Contest. I say then *cogito* is not the first notion of the mind, but *simpliciter scio* is, i. e. *simplici intuitu scio*, or *nosco ideam sensibilem*; neither is that or cogitation or a complex *intuitus* most certain (which implies infallible,) bycause the Senses may and do often err. Neither does it necessarily follow; bycause you must first think or know another man hath an essence and existence, before you can think or *simpliciter* know you have one; and you may be mistaken in both, and consequently not certain. You must first by sight or feeling know another man has a Being, before you can know your self to have one; for you cannot see your own eyes or sight, nor hear your own hearing, &c. Now comes your complex cogitation, and forms their *enthymeme*, or short discourse, bycause I see or feel another has a Being, I do think I am like another Man (which is but conjecture at best) therefore I think I have a Being. Thirdly, it appears by what's here premised, *Cogito ergo sum*, is not the first and most certain consequence, though it may be a probable one, and certain for the most part; and whether you do know all this foregoing *lana caprina*,

or not, you may be capable to understand Philosophy. *Quantum est in rebus inane!* Our first and simple thought or knowledge must come from the sense of feeling, that preceding by a long interval of time (tho' in some Animals longer, in some shorter) all the other Senses; bycause the first thing an Animal perceives, either from the compression it suffers in the Birth, or coldness of air, is pain, which is a mournful feeling (*sensatio tristis*) and consequently is immediately expressed by crying in an Infant, Chicken, Whelp or Kitten; for it is many weeks after the Birth an Infant can see, hear, tast, or smell, or at least before it appears by any Action, or sign of Action, to have the use of any of those Senses; moreover for many reasons (too many to be inserted here) it must see before it hears, and smell before it tastes, and likewise it must have two Senses at least, before it can be said to have common Sense, and it must have common Sense a considerable time before it has Understanding.

A *Fetus* completely formed in all its parts, and aggrandized to its just uterin dimensions, dying at the instant before it was born, was not an *homo*; bycause it had no rational Soul then, nor any time before, nor after forty days, which is the usual time of formation, and the time the Civil Law doth assert, and imply the Soul to be infused into the Body, at that very Instant when the Body is formed; bycause all its Organs are now fitted to receive the Soul; so that if the Soul was not infused then, those Organs would be in vain, and *Deus et natura nihil faciunt frustra*. This is contradicted; bycause the Organs are not perfected; for they are not arrived to their just and full dimensions, before the instant the *fetus* is born.

2. The *fetus* is part of the Mother, and is actuated by the Mother's Soul, in comparison to Fruit upon any Tree, which as long as it hangs upon it, is continuous

nuous with it, and is fed and nourish'd by the Juice of the Tree. But at the Instant it falls off from the Tree (that is, is protruded by the quantity of Sap flowing to it, which not being capable to enter into the Fruit, now it is mature, and has acquired its utmost magnitude, so that it can receive no more; the Force of that abounding Sap, thrusts it off) its no longer a part of a Tree, but a mature Fruit, Apple, Pear, &c. of it self. Now the Organs of a *Fetus* not being perfected before the *Fetus* is come to its full Maturity and Born, the Soul would have been Frustraneously Infused before, so that the foresaid Maxime makes plainly against the Civil Law. Moreover its evidently Attested by *Genesis*, Chap. 2. v. 27. *The Lord formed Man of the Dust of the Ground, and (then, and not before he was perfectly formed) breathed into his Nostril the Breath of Life; and lastly, an Embryo at the End of its Forty Days formation, having been Engendred, as it were Rotten, by thorowly Pocky Parents, so that it much necessarily have Died before its Birth, when there was not so much as a Potentia of ever being an Homo, it cannot be imagined that God and Nature should infuse a Soul into it so Frustraneously. The Lutheran opinion of the Souls being ex traduce, and in its self mortal, but ex gratia divina, rendred immortal (a Contradiction) is the only Foundation the Civilians have to ground on the Perfection of an Homo at 40 Days end after Conception; but then they may as well infer thence, that the Conception of a Minute is a perfect Homo, the Soul being Propagated by and with it. But the Preceding Arguments make this opinion Repugnant, besides innumerable others, and therefore ought not to be Controverted by them, nor any others, matters of this Nature being better and more safely remitted to a Gradendum, importing a be-*

a belief of things above reason, but withall, not Repugnant to true Reason.

As above I shewed a Succession of the Senses first appearing in an Infant newly come into the World; I ought not to omit to Insert their Successive Disappearing at a Man's (or a *Homo's*) Death. We do commonly say, a Man is Dying, when we perceive his Senses do begin to Decrease (in a Mortal Disease, whether by Sicknes or Age, which is a sort of Disease in a particular meaning) which for the most part, begins in the Sight, grown first very Dimme and weak, and therefore they usually Darken the Room to prevent the Offence of Light. The Sight being gone, the hearing grows more Acute, bycause some few of the Spirits that were used to be Transmitted to the Sight, are Distributed to the Hearing, being next to it, which in some measure, do render the Hearing much quicker and sharper. These Expiring next, the Scent being nearest Decreases, and soon quite goeth off; then the Taste next; the Internal Senses next; but not the Faculties of the Rational Soul, viz. the Understanding and the Will (which last, I do not take for a Distinct Faculty) that always do Accompany the Soul, which as it comes the last in, goeth the last out in Order; but the Feeling continues last, which goeth off soonest about the Toes, Feet, next the Legs, then the Thighs, wherefore its Customarily said, a Man Dieth upwards, that is from below, being farthest from the Brain, which is the first Original and Fountain of those Animal or Sensitive Spirits, so that in course, the Brain must Die last, and at that very Instant the Soul departeth from her chief residence; so that it must be a Vulgar mistake, that the Heart is the *Primum Vivens*, & *Ultimum Moriens*.

I ought to have observ'd to you, that oft some Sick Persons, no long time before their Senses begin

begin to Decay, their Hearing and Seeing is much more Acute than in time of Health; notwithstanding their Senses be so very weak; the reason is, the animal Spirits being almost spent, the small remainder is rarefied into the greatest tenuity, or fineness that's possible, and thence it is the Senses are so acute, but that doth not last long; for soon after a very quick decay follows. In the same manner it happens very oft in a Fire, where the oyliness being almost consumed, the little remainder is rarefied into a great tenuity, which therefore appears blew, like unto the subtil oyl flames of Brandy kindled into a fire. Those blew flames are not lasting, nor very strong in scorching or burning, and soon expire, and then its said the fire is burnt out. The like blew flame may be oft observed in the Snuff of a Candle, being near extinguishing.

10. To prevent too long moaping either in writing or reading of one subject, being at the end of a Paragraph, I will make a short digression, yet not very remote from the matter I have been treating before, which is abortion, or somewhat at least relating to it) into the reasonableness of our Common Law, and the Severity of the Civil Law in *Germany*, and some other Countries, in reference to a criminal voluntary abortion, caused either by the Mother her self, or by wilful violence offered to her by another person, occasioning abortion. The former Law makes it only a great (not an high, that referring to a Crime actually against the Government) Misdemeanor, and not Murther; bycause the Law judgeth it uncertain, whether the *fetus* would ever have been born into an *homo*. By the Statute of 21 Jac. 27. the sum whereof is comprized in these words: It shall be Murther for a Mother to conceal the death of her Bastard Child, unless she can prove by one Witness (at least) that it

was Still-born. The Geniture, until six Days, is called a Conception; until forty, or two and forty days, the Conception is called an *Embryo*; at forty days, and from thence to the Seventh Month its called a *Fetus formatus*; at the Seventh Month, and from thence to the Ninth Month its called a *Child*; that is thus, at the Seventh and Eight Month its a Child without Hair and Nails, being Born at the Seventh Month it may live; at the Eight Month it seldom or never doth live; but at the Ninth Month is a complete Child, with Nails and Hair, but not an *homo*, until its come into the World; for at that Instant, it hath a Soul proper to it self infused into it; whereas before it was informed by the Soul of the Mother, and was part of the Mother *quatenus* a Mother. Hence follows, a Child cannot be said to be Murthered within the Womb of the Mother, bycause Murther is the depriving of the life of an *homo* through violence by another. But what doth the Law call Still-born? You say, when it doth not cry at its Birth, and consequently its dead; bycause all Children, if born alive, do cry, which I deny, though most do, but not all. At the eighth Month a Child cannot be born alive, but must ever be Stil-born; Wherefore a Mother whether she conceals, or not conceals the Death of her Bastard Child, she cannot be suspected to murther it; bycause it must necessarily come dead, or Stil-born into the World. How shall a Birth of eight Months be known? Its answered, by having the Rudiments of Nails and Hair. A Child at Seven Months can scarce be said to be Stil-born; bycause (though a Child may be Born alive, and continue to live being wrapt up in a Lambs Skin) it comes two Months before the usual time; and therefore can only be called a Miscarriage, and consequently can be no Murther, though concealed; for every Miscarriage in a Woman is not always declared;

red, nor needs a Witness. Yet the Law seems to call it a *Child* as soon as it stirs or is moved in the Womb; and then a Woman is said to be quick with Child; for which reason a Woman's Execution for Felony is respited until she is delivered; bycause otherwise the Woman, who is guilty and the Child in her Womb that is innocent, would be both Executed; so that according to their sense a Child at Sixteen Weeks more or less can be said to be Stil-born, and not a Miscarriage; and from the Conception until Sixteen Weeks, it must be termed a Miscarriage. Suppose a Mother Travelling alone through a Wood is delivered of a Stil-born Child where there is no possibility of declaring of it, or of calling a Witness; or suppose she doth call a Witness, who being in the next Room doth hear her, and will not come at her to Testify the Bastard Child is, or was Stil-born, shall this be Murther? These are Cases that are invincible; in short this Law seems to me full of incertainties, and ambiguities. The latter, as I mention'd before, supposing, that at 40 days the *fetus* is a complete *homo*, doth make either of the foresaid violent abortions after 40 days murther, and punishable with death; not only so, but they punish the intention equally, as if the Fact had ensued, as this instance will inform you. At my being at *Nuremberg*, there was an unmarried Woman's head cut off by Sentence of the Magistrate, for having taken barren Sabin with an intent to destroy her *fetus*, of which she was deliver'd at the expiration of the usual time by a Midwife, besides other Witnesses, proving it to be a dead Child; whence they inferr'd, it was her intention to murther it, tho' otherwise being well satisfied by the Physicians (from whom I had the relation of her Tryal) that it was not in the Power of barren Sabin to destroy a Conception, less an *Embryo*, and much less a *Fetus*. The

like severity of Death is practised throughout most of the Republicks of Germany in case of Adultery, against both Parties, though the one be single, which seems just enough; bycause it may reasonably be supposed, that frequently the single Person drew the other into that Crime; moreover, they judge it a part of satisfaction for the wrong done to the Widdow, or Widdower.

11. *All immaterial Beings (viz. Angels, rational Souls and Divels, God only is excepted) are imperfect in their essence, (in this following sense only, but in another sense, as you will read elsewhere, they are perfect) which is the Intellectus, whose chiefest faculty is to be Comprehensive, Apprehensive, or Perceptible. The Intellect cannot apprehend or perceive a Negative by any manner of simple Idea, as infinite, incomprehensive, or any other negative thing, as no thing, no man, &c. bycause it implies a contradiction to be comprehensive or apprehensive (as I said the Essence of the Intellect is) and incomprehensive; for then the Intellect must also be in its essence or first faculty incomprehensive. So that if the Intellect could comprehend an incomprehensible, as well as a comprehensible, it must be a God.*

12. In this Theorem all Mankind may easily lose its way, and its self too, consequently run into Atheism, as Aristotle did; and therefore it behoves all Scholars to be very cautious and steady in their reasoning about those matters. To obviate all or most incongruities, that may arise from the said Theorem, this next following ought to be subjoin'd.

13. God is an immaterial perfect Essence, and consequently perfectly comprehensive, who doth positively comprehend himself in himself, thro' himself, and to himself; but as to our selves, we cannot positively apprehend him; bycause his Essence is beyond our reach or capacity of apprehending,

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hending, and therefore they say God is infinite, which doth not contradict, but that God doth positively comprehend or apprehend his own Essence without the least negative, though we cannot apprehend him; wherefore were we perfect Essences, so as to apprehend positively an infinite, we must be Gods.

14. Now, this follows; that God created the World out of nothing, that is, a thing out of nothing, which our understanding or comprehension doth apprehend to be a contradiction, and a negative as to us; but to God, and in God, its a positive; for what is a negative to us, (as I said before) is a positive to God; but its not so *vice versa*, viz. that what is a positive to us is a negative to God.

15. It follows also, that God himself cannot apprehend a Negative in himself, nor of himself; for that would argue an imperfection; wherefore I do repeat again, that what God doth comprehend, or apprehend of himself, in and thro' himself must be a positive, tho' as to us its a Negative. The want of this Thought, and the ignorance of the Theorem which I have stated before, forced Aristotle (compounded out of *ἀεὶς* *optimus*, and *τέλος* *finis*, i. e. *factum* from *πᾶσι* *pro*, which composited makes *optimus factus*, *Subintelligitur Philosophus*) the best of philosophers as he was, and millions more into Atheism, and still doth millions of Fools, according to the saying in Holy Writ, *The Fool hath said in his Heart there is no God*, or to that purpose: Tho' he, or the others, should or do allow a first Cause of all things, yet they say, its impossible that first Cause should cause, make, or properly create something out of nothing, and therefore they infer the World must be eternal: But in spite of all their reasoning, if they do grant an eternal, as Aristotle did in asserting the World to be eternal, they do confess an eternal Cause, which is that we call an eternal

nal God, or eternal Cause; and if eternal than without and beyond all time, consequently increate; bycause Creation implies time, viz. the beginning of time; if an increate Being, he must necessarily be the Creator of all things; bycause a created Being cannot be supposed to create another Being without running into an *infinium*, and confusion, as to say this created Being is the cause of that, and that of the other, and so another and another *ad infinitum*, and a *Nihil*. Here is another Argument I will offer in their favour, viz. Either the World was infinite in respect of time, or finite; or thus, either the World was created in time, or out of time. It was not created in time, bycause there was no motion before the Creation, wherefore it must be created out of time, and consequently infinite, or eternal. Now if there was no motion, there could be no time; bycause time is the measurement of motion according to length, or extension in length. Hence we commonly say, it is two or three of the Clock, bycause by the measurement of the Sun's motion we do find its motion is as long as we do find the length to be from two to three of the Clock; so likewise in a Clock we do say it is two or three of the Clock, bycause we find the Wheels to have moved so long in repeated round lengths, as the hand was moving from one to two, or two to three. And *Aristotle's* description of time is not very different (viz. time is the number of motion *secundum prius et posterius*) though improper enough, and obscure enough: For you cannot number motion, which in respect to time, is continuous; you may measure it in the length, and divide that length into Numbers foregoing and following, which I presume is what he means by *prius* and *posterius*; for he cannot mean *prior motus et posterior motus*; bycause a continuous motion in it self has no parts, but what the mind divides it into. And motion,

motion must be into length, which he will not allow, if my Memory fails not, but refers motion to magnitude; which is more improper than all the former; bycause we cannot say how big or how great a time it is, but how long a time it is we can and commonly do. But this Definition is as many of his are, *viz.* some few true, many only seemingly true, and the rest down right erroneous; as must consequently be their divisions, the uncertainty of all which, has not only caused many Sects, as *Thomists*, *Scotists*, &c. but they stand in need to be supported by innumerable props of distinctions, filling up the great Volumes in folio of *Smarez*, *Pontius*, *Arriaga*, *Oviedo*, and many others, besides the minor Jesuits, as *Eustachius*, *Raconis*, all whose Rapsodies are confutable in less compass than a Sheet of Paper; so that I blush, when I consider, how those Superstitious Rats have spent all their time in their Beads, and Writing such a confusion of Vanities, among whom *Smigletius* was not accounted the least Fool. However the World is beholden to *Aristotle* for his great numbers of Terms, which are very necessary to express one's mind by.

16. I return to answer the *Enthymeme* offer'd above to prove the eternity of the World, whereof the Antecedent is plainly false; bycause the World, I mean the Earth, was created by motion of the Creator; that first motion (speaking *ad caput humanum*) must be accounted the beginning of time, and therefore the Earth was created in the beginning of time, and in the beginning (of time) God created the Earth; so that the World as soon as it was completely formed must be six days old, and but two days, if accounting by measurement from the first motion of the Sun; tho' commonly the Age of the World hath been accounted from the complete formation of the Universe, which is expressed by the number of Years following the beginning, *viz.* *ab orbe condito.*

17. All the motions of the Creator (Creation only excepted) in the formation of the World, though *primo intuitu* they appear infinite, may be apprehended by the intellect, or by all intellectual Beings; bycause they are all finite motions, and the Effects or *causata* are finite Bodies, that consequently are within the reach of intellectual apprehension. An Infinite Cause can and doth effect finite *causata* and Effects, (*Omne majus continet minus*) without being repugnant to the maxim, *qualis Causa talis Effectus*, which is only to be understood of finite Causes and Effects; for the Intellect being finite can make no other Axioms, than of finites.

18. All actions, and their Effects and productions of Rational Souls and of Angels are imperfect, and impossible to be perfect; bycause they are acted or caused by imperfect Beings; consequently an infinite Essence can only be perfect and act perfect actions, or cause perfect Effects and productions, and cannot err, but must be infallible and certain; which proves that no Science can be certain in all its parts, but subject to Errors. Uncertainty may be apprehended absolutely and *Simpliciter*, or Relatively and *Secundum quid*. Some things are *quodammodo* certain as that there are Essence, Existence, Rest, Motion and Place; consequently it's as certain, there must be a corporeal and finite Essence, and an incorporeal and infinite Essence; bycause finite and infinite in this sense are *relata positiva*, and *Relata do sese mutuo ponere & tollere*. In another Sense finite and infinite are *contradictoria*. Here you may plainly observe, how narrow Speech is, that we can scarce find Words enough to express our several Meanings, or intellectual Idea's, in regard we are constrain'd to make use of several distinctions, to render the same word different from its self, or *primar genuin* imposition.

19. Existence being apprehended *Universaliter*, and abstracted from all singular Bodies, is the first or nearest Property of Corporeal Essence, which (*viz. Essence*) Implies no more, than what the Mind apprehends a thing to be, what it is. *Essentia est, a qua dicitur aliquid esse id quod est in intellectu*; and *Essentia corporea est, a qua dicitur corpus esse id quod est in sensu*, which is a sensible quantity or extension. Now, as soon as the said *Essentia* is *ex*, or *extra locum in intellectu*, then it is no longer properly to be call'd *Essentia*, but *Realitas*, and so *ens*, which is the concrete of *Essentia*, as soon as it is out of the *Intellectus*, is no longer to be call'd *ens*, but *Res*, hence derive all these opposite and relative sayings; *esse in ratione esse in re*, *ens rationis Res*, *ens potentiale res actualis*, *essentia Realitas*, &c. *Essentia* and *ens*, are properly Objects of the understanding; *Res* and *Corpus* of the Ext. Senses. *Res* is a Genus to *Corpus*, *Res* being an object of all the Senses, and *Corpus* primarily, immediately and properly is, only of the Sense of Feeling; for we cannot see a Body unless Secundarily, and mediately by the Luminous Air, nor hear a Body, but by the Noise it makes in the Air. But you may feel a Body immediately, so that the greatest certainty we can have, is derived from every Sense its perceiving its proper and immediate object; hence it is, we are so oft deceiv'd, by Judging of Bodies by our Sight and Hearing, and not by the Feeling. *Res* signifies above Forty several meanings, *viz.* business in *rem habere*; good in *Respublica*; a Law Case; an immodest Action in *rem habere cum aliqua*; purpose in the Words *ad rem*; profit in the Words *in rem*, and abundance of other meanings besides what *Rhetoric* by her Tropes and Figures, turns not only the Word *Res*, but all other Words into, which makes the same Word signify near above an Hundred meanings, and implys a want
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of Millions of proper Words for the Understanding to express its meaning in. Now what a Confusion this Variety of meanings of the same Word, and what innumerable mistakes must all this put the Understanding by. In short, all is Confusion, Mistakes and Vanity; which has occasioned me to say in another place, its equally easy, to prove Black to be White, or Light to be Dark; as it is as easy to Disprove and Defend it, by Confounding the Various meanings of Words; insomuch that it's in your power to Disprove all what I have said in this Treatise, and mine to prove it; & sic in cæteris omnibus; only both you and I must approve of what appears most probable, *sed hæc obiter*. Observe also by the way, to say *ens reale*, is Improper, bycause *ens* being the Concrete of *Essentia*, if *Essentia* is only Intellectual, as I have shew'd by property of Speech, it must be, then *ens* can only be Intellectual. But bycause of Narrowness of Speech, we have no other Word to express an Universality, commonness, or a *Genus* to *Ens rationis*, and *Res*, we are forced to allow of the Word *Ens*, late *Sumptum*, to be a *Genus* to an *Esse in ratione*, and an *esse in re*, and in that Sense we call it *ens rationis*, as it is a Concrete of *essentia*, which is in this sense always in *ratione*, or *intellectu*, and *Realitas* is ever in *loco externo*. So that *ens*, as it is a *genus*, is a common concrete of *Essentia* and *Realitas*. I confess I have unavoidably deviated from Natural and Corporeal, or *Natura* and *Corpus* to *Metaphysics* (which is *supranatural*, and *supracorporeal*, avoiding to name it incorporeal, though hereafter thro' narrowness of speech I must be forced to use that and other negative and contradictory Words, bycause it implies *non corporeal*, which is scarce to be understood; for a *non* is *nihil*, and of *nihil vix est Scientia*) being a *scientia merè intellectualis* of *Essentia* in the abstract, and *ens* in the concrete. I must
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by the way observe, 1. how narrow Speech, or the expression of the Mind is, when it is forced to make use of the several Words, as propriety, faculty, power, affection, attribute, effect, *accidens*, quality, &c. which in one sense import all the same, and according to our different meaning, or making a reference, or *relatio* of 'em to *relata*, do each imply a several and different sense. 2. That the naked explication of *ens* and *res*, as I have here set it down, is of great use to detect the folly of the Jesuitical peripatetics in their nonsensical distinctions of *ens*, *entitativo*, *mens*, *mentalis*, *essentia*, *essentialis*, *potentia*, *potentialis*, and their subdistinctions of all these Words, which would make a Ploughman burst into laughing. And the use of rightly understanding *ens* and *Res* is great, in preventing us in confounding *Metaphysics*, and its confounding Terms with *Physics*, and its terms, as some Scholars are apt constantly to do, and thence forced into a confusion of errors, contradictions, and frivolous distinctions. To return to Existence, I say, whilst essence and *ens* are in *intellectu*, you cannot properly call them existence and existent, but *insistence* and *insistent*; because they do *sistere in*, or *stare in intellectu tanquam in proprio loco interno*; but as soon as essence and *ens* are come out, or turn'd out of the Intellect, then they become, as I said before, *realitas* and *res*, *existentia* and *existens in loco externo*, viz. out of the Intellect, as their Compositions do plainly denote, viz. *ex* and *sistentia* (not in use, meaning standing, or *ex* and *sistens*, which both make existent or standing out of the intellect in an external place; or thus, *essentia* the abstract is derived from *ens*, and that from *est*, which ought rather to be called *inentia*, *inens* from *inest*; bycause it is to denote a being in the understanding. Wherefore you cannot properly say *essentia existit in intellectu*, but *inest in intellectu*; on the other hand

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you cannot say, *realitas* and *res habent essentiam & existentiam in intellectu*, but *habent esse & existentiam in loco externo*. In like manner, *potentia* hath only its *esse in intellectu*, and *actus in re*; as *Universale in intellectu*, and *singularia in rebus*, &c.

20. But considering (as I said before) the narrowness of Speech, and the great defect of proper Words, the Understanding is forced to use all or most proper words in an improper, comparative, resembling, relative, tropical, figurative and abstracted Sense, and apply them very oft to a contrary meaning. Thus the Understanding doth abstract an *Idea*, or a representation made upon it self from all real, actual, and external things, and those *Idea's* do then become meerly and absolutely intellectual, without having any the least dependance upon the real external Beings, from which they were abstracted, as the painted Picture of *Paul* or *Peter* is absolutely and independently different from the real *Paul* or *Peter*, tho' they were dead after their Picture was abstracted, or drawn from them: Hence it is that School-men say, that all intellectual Beings, *Idea's*, or Notions, for instance an *Universale*, have their *fundamentum in re*, though they should have said, have, or have had, bycause its possible after the *Idea*, or rational Being is abstracted from the real thing or things, they may be annihilated; nevertheless the rational Being would continue. Hence it is, that the Maxim saith, *Nihil est in intellectu quin prius fuerit in sensu*, not *quin sit in sensu*; so that there is no real Being, but it hath a mental Being, Notion, or *Idea* in the Intellect, that answers to it, and continues to be an *ens rationis*, tho' the *ens reale*, from which it was abstracted, is annihilated. And it is as true, that there is no *ens rationis*, but there is, or hath been an *ens reale*, from which its picture was drawn, or *Idea* abstracted by *ratio*, to answer to it; also the word

or notion of *Universale* is no more than a *nomen collectivum*) or a *notio collectiva* of all singular real Beings together that answer to it. Wherefore I do say, that all Words that are applicable to real Beings, may be, and are actually applicable, and applied to *entia rationis*, tho' not properly, as I said above, but improperly and comparatively only, or *similitudinarie*, if I may so call it. Hence it follows, that essence, existence, *potentia*, *actus*, rest, motion, and all other real Words may be attributed to an *ens rationis*; and all *significativa nomina rationis* are applicable either *conjunctim*, or *divisim* to real Beings *E. gr.* the name of a fictitious Tartar, expressing half a Man and half an Horse, is applicable *divisim*. Its a consequence of this Discourse, that *Metaphysicks* can be no other Science than of an *ens*, and *essentia rationis*, and of all their properties, attributes, accidents, &c. as they are *Idea's* and notions abstracted from *ens* and *essentia*, that are *realia*. 2. *Universalia* are not always certain, and consequently *Sciencia*, which is always *de Universalibus*, is not always certain; bycause the portrait or *Idea* may possibly not be taken from all singulars exactly, truly, or plenarily, which proves so in most universals, if not in all; and for that reason I may believe, that the *Idea* of an *Universale* is abstracted from *singularia* only *ἡ πᾶσι*, and impossible to be taken from all. But to imprint this more firmly upon your apprehension, I shall resume the matter of *Idea's* in another place.

21. The Intellect and Nature are distant from one another in the farthest Degree. Nature, *viz.* *Natura naturata* is the power of the Creator (who is *Natura naturans* tho' very improperly) and the Intellect is the faculty of the Rational Soul; but their operations are extremely different one from the other. The former operates in the greatest order, constancy and immutability, and

rule; the latter in the greatest disorder, mutability, and indeterminate and unlimited Irregularity. It is a most pleasant contemplation to the Intellect to behold the regular, immutable and orderly motions of Nature, and is as much unpleasant to its self, to remark its own Irregular, mutable, disorderly rambling and undeterminate or unlimited motions. As natural motion is the thrusting one body out of its place into the external place of another, so intellectual motion is the thrusting of one *ens rationis*, out of its intellectual place into the internal place of another in the intellect. Internal here is said in reference to the External place, that's out of the intellect, i. in the Univers; at the same time you must observe, that in the Intellect it self in respect to it self, there is also an internal *locus*; and external *locus* of an *Ens rationis*, and its parts; bycause there is nothing in *re*, but the Intellect can abstract an *Idea* from it; but then I do affirm, that the Intellect cannot make any different *Idea* in its self, but what it must abstract, or hath abstracted from an external thing, *res*, or body, by means of the Senses; except only that, which by a rambling disorderly irregular mutable and unlimited division (or motion) and conjunction of an *Idea* is abstracted from *aliquid reale*, which Nature cannot do; bycause all her motions are immutable, regular, orderly, and limited; for instance, the Intellect can and doth make an *Ens rationis* by dividing a Man and a great Fish into halves, and joining the one half of the Man with the other half of the great Fish into a Mareman; but still the *Idea* of the parts of that Man and Fish is taken from a real Man and Fish; and so in all others. This is designedly inserted here to prove succinctly and demonstratively, the most difficult and principal point of all Philosophy, *viz.* That the Rational Soul is intirely immaterial and incorporeal

real; and consequently immortal? All sensitive Creatures can and do receive a simple impression of *Idea's* made by external real Beings upon their Sense actuated by Animal Spirits, continued to Animal Spirits actuating the common internal Sense, and goeth no farther; this *Idea* stirs their locomotive animal Spirits (which are continuous to the foresaid sensitive Animal Spirits) and moves them by continuation, either to shun, or follow and embrace, what those said *Idea's* represent. What ever those Animal do or act, is by natural instinct, or common compulsive motion; the frequent repetitions of those acts performed by the animal Spirits, being moved frequently in the same way and manner, makes it an use, custom, or what else you will call it. What ever they afterwards appear to act is by custom, a Dog or any other Beast, knows his Master, and every person of his Family by custom, if he is left abroad, finds his Home by custom: If one Dog falls upon another, its either by instinct, or want of custom. In short, no Animal can perform any act but what is simple, and not in the least complex, and what proceeds from natural instinct and custom, compelled to it by the said *Idea's*, made upon his Animal Spirits, which are all simple, without any reflection, comparison, or composition. Notwithstanding though all the various acts that are performed by a Dog, or any other Animal, importing a Sensitive common Sense, imagination, and memory, yet it doth not in the least hinder, but that they are caused by instinct and custom, and only by the single impression of *Idea's* continued to their internal Senses. Moreover though I see no necessity of allowing more than one internal (which is the) common Sense, neither do I believe there are any more internal Senses, which I do only take for various acts of one and the same faculty, yet I will not seem so Heresodox, or so much an

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Innovator, but that I will continue, and call them by the same Names, that most Learned Men do think fit, and hath been usual to denominate them by; and if they think fit, that such matters shall be done *per plura*, I will not be so shagrin, as to affirm it to be *frustra*, though they may be transacted *per pauciora*. *Oportet ingenuos quandoque morem gerere.*

22. I have explained, how far the operation of a sensitive Soul doth extend; but the Operations of a Rational exceed the other in its Operations beyond all comparison, and therefore must necessarily be intirely different from it, in regard it is capable of receiving hundreds and thousands of *Idea's* at one time, in the manner of a Looking-Glass, that at once receives the *Idea's* (or representations) of hundreds of Objects or things, that are in one room at once. You are to take notice, that the word *Idea* is by use, custom, and common agreement of Philosophers, peculiarly appropriated to the representation of things made upon, or made to the rational Soul. And beyond this she is capable of uniting and dividing any of those *Idea's*, whereby she makes thousands of *entia rationis*, and beyond that by comparing, or making them different, and setting one *ens rationis* in one place of the intellect, another in another, and so on, by comparison of the different actions or operations upon the Soul, she makes various inferences and conclusions, or syllogisms, and discourses, or complex or compounded notions; she can instantly by thought (which is a principal Operation of the Soul) transport her self to all places of the Universe, to the *East* and *West-Indies*: In short, she is capable of acting or operating any thing, whatever an Angel (in one respect) can be imagin'd to act or operate; she is an Angel seated in a sensitive Body. She is capable to attend God Almighty, as a Minister, in all

all his Commands imposed upon her. A pious and obedient Soul doth now accompany the great God, who is in Heaven, on the Earth, in the East and in the West, and ubiquitary in all places; so that the Soul differs from an Angel, in this only, that she is not in Heaven, but placed in Purgatory, which from your patience I will crave leave to explain this subject below, as appertaining properly to *Metaphysics*, whereof this Theorem doth chiefly handle; besides any Subject may be discoursed of in a Theorem, which hath but any reference to it, and for that reason, when an Author intends not to treat methodically of a subject, he doth chuse to write his Matters in Theorems. But before I take the forementioned Explanation in hand, I ought to make Answer to a questionary Objection, *viz.* If the Soul be rational, and rationality inseparable from it, which implies it must be always rational; Why doth it not appear to be such, when a Man is in sleep, the Soul being supposed never to be in sleep? I answer by way of Question, Why do not your Eyes always see, when it is dark? You will answer, Bycause they want an Object, which is Light, and so doth the Soul stand in need of an Object, that is to be handed to it by way of *Idea*; so that the Soul can nevertheless be said to be Rational, which imports no more than that she has the power of reasoning, which Power she always has, and is inseparable from her, tho' she doth not always exert that Power into an act of Reasoning. An Angel is no more than a ministerial rational Being, and not a Soul; bycause that implies a relation to a Body, *Anima dicitur, quia animat corpus*; and *Angelus, quia est minister vel nuncius Dei*. In like manner we may describe God by his most comprehensive and chiefest Attribute, to be *universalissimum & summum rationale Ens*, which comprehends *summa sapientia, summa*

prudentia, and *summa providentia*, and these attributes do *ordine dignitatis* precede his *summa potentia*. God in all his Attributes is *summus*. God cannot be defined logically, bycause he can have no *genus proximum*, or *differentia specifica*; but the describing God by the *infinitas* of all his Attributes, as to say God is infinitely Wise, infinitely Powerful, &c. is like to a subtil Jesuit to deny God, by negatively describing him: To say God is not finitely Wise, or not finitely Powerful, what can this otherwise mean than God is not Wise, nor Powerful? Neither will it any more hold in positively saying God is most infinitely Wise, or finitely Powerful; which is Blasphemy. But to describe God to be the most Wise, &c. doth import what a Man would express by infinitely Wise, that is, Wise beyond all bounds of human and angelical Wisdom. To say most Wise, is to say, that all things are less Wise than the most Wise.

23. I have plainly enough demonstrated, that the rational Soul can make an *Idea* in the Intellect of Rationality, which is her self; if the Soul be rational, she must be immortal, bycause she hath no contrary in her self, nor out of her self, to destroy her *actus*, much less her *potentia*; in short, the Essence of an immortal Being cannot be destroyed by an immaterial Being, not by God himself; bycause he has created it infinite; now God cannot do and undo, for then he would be mutable: irrationality, i. e. nonrationality cannot, bycause that is no *oppositum contrarium* to rationality, but a contradiction, which is not destructive, or contrary. For Example, I say that is a Fire, you say that is no Fire, your saying doth not destroy the Fire, but Water, which is contrary to it, may suppress its *actus*, but not its *potentia*. This will be explained below. If a Soul can make an *Idea* of her own Rationality or Essence, she can make
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make the *Idea* of an Angel, by adding the comparative (more) to it, and describe an Angel a more rational Being than herself; bycause he is not clogg'd with a Body, as she is. And by adding the superlative (most) to it makes an *Idea* of God to be the most Rational.

24. The rational Soul by daily experimental deduction is most certain, that there is a First or Original of any Kind or *Species* of Beings. By forming an *Idea* of Wisdom, Power, &c. and adding it to First, or Original, makes a Description of God, *viz.* God is the first or Original of Wisdom, Power, Rationality, &c. which last *Genesis* doth express to be God's own Image, which he did bestow on Man, wherefore the Description of God to be *ens Summe Rationale* cannot be improper, though the most proper is to describe him by all his Attributes.

25. The abovementioned Explanation is easy and evident. In regard my intention here is to expound philosophically some part of the first and second Chapters of *Genesis*, I ought to advert you, that the various and gradual steps, which the Mosaic Revelation describes the Creator to have made in the Creation, are to be conceived written *ad captum humanum*, for reasons best known to the Omnipotent, not to be search'd into by the impious folly of any his Creatures; or otherwise it was in his Almighty Power, by one act to create the World in all its parts, as now it is, *V. 1. In the beginning God created Heaven and Earth*, that is, he made Heaven out of the Earth, as the following Verses do plainly manifest. *v. 2. Earth* here was the *Chaos*, or unlimited universal quantity, without Form, and therefore a confuse interminate Figure, or Surface, and consequently void of containing any Creatures inanimate, or animate. *And Darkness was upon the Face of the Deep*, which is the first step, namely, the limiting or circumscribing

cribing the Earth with a Surface, or Face, comprehending Longitude, Latitude, and Depth; which makes a determinate quantity, or extension.

26. Before I proceed, I must repete the difference between Creation, vulgarly and erroneously said to be the causing a thing out of nothing, which implies a plain contradiction, and is repugnant to a most common and true maxim, *e nihilo nihil fit*; wherefore I do assert, that Creation in a strict and proper Sense, is a production of an immaterial or material Being, out of another previous and preexistent immaterial Being by, and through an immaterial Being; thus Angels and Rational Souls may be said to be created *a Deo a Deo & per Deum*. The Chaos or Earth, mentioned in the 1. and 1. of Gen. was created *ex ente immateriali a Deo & per Deum*. It is not repugnant, that a material Being, viz. the Earth should be created, or produced out of an immaterial Being; no more than a material Being should be produced or created by an immaterial Cause, or that the immaterial Rational Soul should be united to a material Body, that is made one *socium* with the Humane Body, which therefore is properly a part of a Man; the former being no more inconceptible, or less conceptible than the latter. Neither is any part of the forementioned assertions in any wise repugnant to the Catholick Orthodox Faith, as far as I can conceive: Wherefore according to this acceptation there were only three Beings created, viz. two immaterial, an Angel, and the Rational Soul, and one material, to wit, the Earth or Chaos. In a larger acceptation Creation doth not only imply the forementioned Creation; but also a formation, that is, the shaping of a Body, or the production of one Body out of another, into such or such a shape, or in this latter Sense, I may say, Creation

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Creation is a Synonymous Word with formation, and promiscuously used throughout the Holy Scripture the one for the other. Thus Heaven in the 1. and 1. of *Genesis* is said to be created that is, formed, as appears by the 8th and 9th Verse of the same Chapter. Moreover wherever in this first Chapter its said, *let there be*, is meant formation out of the Earth, Water, Air, or Fire. By God's saying *let there be*, it must be understood to be spoken to the Holy Ghost, which is meant in the 2d Verse by the Spirit of God; for it cannot be thought, that God the first Person in the Trinity should speak to himself, as first Person, but the Third Person God the Holy Ghost, to whom he did likewise speak when he said, *let us make Man*; that is, form Man's Body (Chapter 2. v. 27.) out of the *Dust* of the Earth, whence I have derived Dusty Particles (in several places of this Treatise repeated) synonymous to *Des Cartes* his *particule subtilissima*. In this latter acceptation God is said, v. 21. to create great Whales, and all Kinds of Fish, winged Fowl, and every moving Creature, that is formed or produced out of matter, as the 21st Verse explains. Also by Creature for the most part must be understood Bodies formed or produced. 2dly, You may observe, the whole Creation mentioned in *Genesis* was caused by God the first Person, and God the Holy Ghost the Third Person of the Trinity. 3dly, Heaven in English is so called from being heaved up from the Earth. The Waters, implying fluid Bodies (being *Æther* superior and inferior or Air are divided in Verse 6, by the Firmament. By Waters under the Heaven, that is, under the *Æther* and Air in Verse 9. is meant *Aqua dulces, pura & limpida*, not the Salt Sea, whereinto those sweet Waters were turn'd after the Fall of *Adam*; they were heaved up from and out of the Earth *Colum* is derived

a calando, engraving, from the *Æther* having the Stars ingraved upon it; and *egredis* from *egredis* *asus* or I look upwards; all which derivations do import, that by Heaven in the first Chapter of *Genesis*, nothing can be meant but Waters, or *Æther superior & inferior*. 4thly, Heaven in most other parts of Sacred Writ is an incorporeal place, circumscribing or limiting the faculties of Angels in their immaterial extentions. 5thly, That where ever God is said to be in a place, its spoken only *ad captum humanum*; for God cannot properly be said to be in a place (though in a metaphorical manner he may) bycause no place *ratione* can be thought in any measure to circumscribe him. Wherefore God doth exist *in se & per se*, and doth consist *ex se, in se, & per se*. 6thly, That by Man is sometimes and chiefly meant Man and Woman comprised in the *Latin* Word *homo*, the *English* and *French* Tongues having no word answering to what is expressed by the Word *homo*, though the *German* and *Dutch* have, *viz.* *ein mensch*. Woman, is a Word contracted, *viz.* Out of Man, *W* meaning out, O of, Man; that is, she was formed out of the same red Earth Man was; wherefore she being said to be created out of one of Man's Ribs, is to be understood Metaphorically, *viz.* as the Rib of a Man is the middle, Center, and chief part of a Man, so the Woman is to be esteemed as a chief part of the Man, and Flesh of his Flesh and Bone of his Bones; so that in this Sense Man and Woman makes one and the same *homo*; for Man alone cannot be called *homo*, but only a part of *homo*, and Woman being added to him as another part makes an intire *homo*, both being formed *ex humo*. Only *vir* is the *vis*, or *anima*, and *mas* is *quasi Major* to *femina*, which sounds *quasi facta minor*.

27. Observe, that all those words And here used must be taken *divisim*, and for Steps. And
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the Spirit of God moved upon the face of the Waters.
 The Spirit denotes strength and Power in motion or moving, as we do all perceive, that our force or strength in motion is caused by our Animal Spirits. 2dly, Observe, that the Power of God was first exerted upon the Surface of the *Chaos*. Whereby its limited extension was divided into grosser and solid parts, and thinner and fluid parts, the former importing the Earth, and the latter *Æther*, Air, and Element of Water, which are here meant by Waters or fluid Bodies. The *Æther* turn'd into light as will be shewed in another place, and the Earth continued dark, so here was a separation of Light from Darknes, v. 6. *Let there be a Firmament in the midst of the Waters.* Firmament signifies a strong Barrier, or division in the middle of the *Æther*, or Waters, by which it follows, that the *Æther* must extend as far beyond *ultra* the Firmament, as it doth *citra*, or towards us. The Waters under under the Firmament were *Æther*, Air, and Elementary Water, which two latter being confused into one another, and not separated but spread over the whole Surface of the Earth, are in the 9th v. separated; and the Water strictly so called was gathered together into one place, and left the Land dry; and in the 10th. v. *God called the dry Land Earth, and the gathering the Waters Seas:* The 11th v. mentions the production of Seeds of Grass, that is, all sorts of Herbs, and of Fruit Trees with a propagating power of bringing forth other Seeds. These Seeds did germinate being dispersed through the Surface of the Earth by the motion of the cirrounding Air, which continued to be very violent so soon after its division, whose most subtil particles entring the pores of the Seeds did soon expand and display all the parts and particles of the Seeds, to give admission to the juice of the Earth, which the same motion

Of the Air forced into the said expanded pores of the Seeds, from which they had their increase and augmentation of magnitude. So that it's the motion of the subtil particles of the Air doth cause germination principally, though much more when accelerated in their motion by the additional motion, that's caused by the Sun. Herbs do germinate, and Animals do propagate and grow in *Greenland*, though both very slowly by the slow motion of the Air, being but very little, if at all, assisted by the motion of the Sun. Besides, some Seeds will grow in the Winter in a fine mould that's a little moisten'd with Water, and *English* Spirits digested with a very small portion of Salpetre, and put at a convenient distance from the Fire, without any, or very little assistance of motion from the Sun. It appears that Vegetables did grow before the production of the Sun and Moon; But Animals requiring for their growth and propagation the assistance of the greater luminaries, were made after. And among these Fish was made before Fowl, next Cattle, next Creeping Things, (*reptils*) next other Beasts of the Earth; and last of all Man, first the Male, next the Female, in the Image of God, (twice repeated in the same Verse) to whom he gave the Dominion over all the Vegetables and Animals, (and consequently by the greatest goodness of God were created for him) and settled him in the Garden of *Eden* beginning Eastward, that is, at the Rising of the Sun, consequently implying ending at the descent thereof, which signifies, that the Garden of *Eden* extended over the whole Face of the Earth, that was smooth like to a Bowling Green, (the Air calm, sweet and serene, the Sea quiet, smooth and even, appearing like to an Emerald) being adorned with the most beautiful fragrant Flowers, and most delicious vegetable Esculents, also water'd with crystalline Springs;

he was accompanied with a most suitable Companion; The Cattle and all Beast swere serviceable to him, and of lovely Aspect to behold; All which made up the Garden of *Eden*, and an Earthly Heaven or Paradise. For his Disobedience, importing the greatest Ingratitude, and fowlest Crime to, and against his Creator, in return of his greatest bounry, he was cast out of the Garden of *Eden*, that is, the whole face of the Earth was changed; among the Herbs some became Venomous, others scarce Nutrimental; the Flowers had lost their beauty and fragrancy, the Fruit-Trees grown sower, the Waters Muddy and stinking, the Earth filled with Ponds and Serpents, the Cattle become less serviceable, the Beast wild and frightful to look at, the Air disturbed with Tempests, Thunder and Lightning, the Sea turn'd boisterous, billowing and foaming in high Waves. *Eve*, who was so beautiful and pleasant in Conversation, is now become subject to all manner of Passions, sickly, crazy, pievish, fretful, noisy, violent, ill fetured and worse complexion'd. *Adam* is fallen into the same imperfections, whence must necessarily arise a perpetual discord and Strife. Here is Man's Heaven lost, wherein he was seated to have continued to all perpetuity. A Question ariseth, whether pious Men after the Resurrection will be restored again to the same earthly Heaven that was lost, which ought to be left to the decision of Divines, Man by his Disobedience incurred the penalty of being thrown out of his perpetual Heaven (where he could never have dyed, but must continue immortal) into the Dungeon of Stinking Earth, or Purgatory, where he is become subject to Death every moment, which he, and all his Descendants must undergo to make Satisfaction to God's exactest Justice; but though thrown out of his Heaven, God being moved by
his

his highest Mercy and compassion is pleased to try him once more, by placing of him in a *Purgatory* to purge himself of his past Crime, and all those uncleannesses contracted by his Fall, and to require his exact obedience to Ten Commandments, in stead of his first one; and least Man should prove incapable of a due performance, and thereby incurr into the punishment of Eternal Death, by his most bounteous mercy he hath provided him a *Jesus* or Saviour, so that once more Man is left to his Behaviour in this World, which is the only *Purgatory*. To make more than three States is very repugnant. Here is an *Heaven* past, a present *Purgatory*, and a future *Hell*.

28. *All real Beings, Properties, Affections, Attributes, &c. may by Idea be made entia Rationis, and all Entia rationis simplicia, indivisa & incomplexa, are responding to Real Beings, Properties, &c. so that Essence, Existence, quies, locus, and all others spoken without any adjunct to it of real, or rationis, may be indifferently understood, or taken for either.*

29. *All real Essences are essential or inseparable Properties. And all first inseparable Properties are Essences. You must apprehend, that Property, Affection, Quality, &c. are all convertible. We can only know, what a thing is, by its affecting our Senses. Quantity by being extended into length, breadth and depth affects our feeling, and by that we know the Essence of Quantity, neither you can make more of it, if you form it into an ens rationis simplex & indivisum.*

30. *Essence, existence, rest, and place are all inseparable Affections or Properties, both in re and ratione. You object, that the Intellect can separate Essence from Existence, and behold only the Idea of Essence. I say the former part of the objection*

objection is impossible, and the latter possible. This matter is very nice, and ought to be well explain'd. You cannot behold the *Idea* of Essence by your intellect, unless it hath a place and existence in the intellect; for what has no place and existence in the intellect, nor in *re*, is a *nihil*. But you may consider or behold the *Idea* of Essence by it self, without considering or beholding its Existence, place, or rest, where it is. But that is not separating the *Idea* of Essence from Existence, Place, &c. Suppose you see and behold the *Idea* of Peter or Paul in a Looking-glass, you can consider and behold the said *Idea* without taking the least notice of the Looking-glass, where it has its Place, Rest, and Existence; But you can neither *re* nor *ratione* separate that very *Idea* in the Looking-glass from the Looking-glass. The Solution of the Objection lyeth only in the Words, considering a thing by it self, and separating that thing, that is in your consideration or understanding from your consideration, &c. neither can you have an *Idea* of Existence without Essence. You Object, you can describe and say, *existentia est vel significat esse in loco*. This is a *Sophisma Verborum*. Pray what signifies *esse* in this description but *essentia*. By all your Objections you can scarce annul this Description; *Existentia significat (vel fistit) Essentiam in loco*.

31. Essence is the first Property or Affection of corporeal Beings, consequently no Being can have any more than one first Property. Essence, Existence, Rest, and Place are the *Principium aggregativum* or *accumulativum* of the Chaos or Universal quantitative Being. Essence, Existence, Motion and Place are the *Principium complexum* of all immaterial Beings, except God; who hath no *principium*; though he himself is the *Principium* of all Beings, consequently all immaterial Beings

Beings are always in motion. The Rational Soul, would be always in motion, were she not hindred by the sleep or rest of the Senses.

32. There is no *Principium simplex* (*Deo excepto*) of Bodies; this, is a consequence of the next foregoing Theorem. And consequently to this

33. The *Chaos* or universal Quantity is not the *Principium*, but the only Element (*signifying quod primum vel proxime sit e principio*) of all Bodies.

34. *Aether, Water and Earth* are the first *Elementata*, and not Elements.

35. *Imaginatio est imaginis actio*, or Impression of an Image, Idea, Notion, or Representation upon the *intellectus*, which consequently and necessarily can imply no more then *Sensus communis*, and therefore is the same as (or is) *Imaginatio*; so that *Imaginatio* cannot constitute a Third internal Sense, different from the *Sensus communis*. The Synonymous Greek Word *phantasia* expresses no more than an Appearance or Representation, from *phaivon* *apparere*. However as I said before, I shall *morem gerere consuetudini Vulgo receptae*, and call *Imaginatio* a distinct *sensus internus*, but I shall mean thereby a distinguishing Faculty, whereby *Idea's* are distinguish'd one from the other, after they have been impressed upon the common Sense, which to speak Truth, that and *sensatio communis* are only two acts of the same Faculty.

36. The *Chaos* considered in reference to itself, is a Body singular, but in reference to other Bodies divided out of it, is an universal Body; or else an universal Body would precede singulars, which is not possible. The *Chaos* was the Sole or singular Natural Body, consequently all other singular Bodies made out of it, by motion and division must be termed violent Bodies, and no
deri-

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derivative singular Body can be accounted Natural, But what is at rest, and in that respect like unto its First, or Original Body the *Chaos*; so that all Bodies in the universe are either Natural, or Violent; and cannot have the same, *Principium complexum*. It follows them that

37. The *Principium complexum of Violent Bodies*, must be *Essence, Existence, Motion, Figure, and Place*. All Bodies that were divided from the *Chaos*, were divided by motion, and motion being violent in respect of rest, that was Natural and *Prior* to motion, must be violent; that is, is caused by violence, and in as much as these Bodies do continue in motion, insomuch they must be violent, and for as much as they remit of their motion, or cease to be moved, for so much they return nearer to Rest, and become at Rest again, and consequently return again to their first *Naturale* of the *Chaos*. 2dly. the motion of all Bodies being violent, must in time necessarily cease (bycause as I have said elsewhere, *Nullum violentum est perpetuum*) and ceasing must return into the *Chaos*, and become a *Chaos* again, as it was in the beginning. Here you will demand, how can it be possible, that the *Aether*, Air, and Water, which are Bodies so extremely Thin, Fluid, and Perspicuous, can become again Dark, extremely Gross, Thick, Solid, Hard, &c. I answer by the ceasing of that Cause, which is motion, that made them Perspicuous, thin, Fluid, &c. Wherefore as soon as the motion of the firmament ceases, at that very instant all the *Aether*, Air, and Water, become all *Chaos*, that is Dark, Solid, Hard, &c. That this is so, I will now prove to you by ocular Demonstration. Take a lump of a Solid, Hard Mass of a Metal, be it Copper, Silver, or Gold, which you shall for the present only suppose to be a small *Chaos*; To make this Fluid,

Soft

Soft, and Transparent, you put it into a Crucible over a very violent Fire, of Charcoal. The Essence, First Property, or nature of Fire- is by the force or motion of its most Subtil Particles to enter into the pores of any objected Body, be it Metallin or other fossil Body, and by distending them to break or tare 'em into the least contiguous particles, and when they can be torn into no less, then they are softned, and run into one another and become continuous by intertexture of their most Subtil filaments; and now they are become more Fluid than Water, and almost as Fluid as Air, and almost as Transparent too, could they be held before the Sun: Here you have an *Elementatum* analogous to *Aether*; now observe, as long as the violent motion of the most Subtil particles of the Fire continue, so long doth that Metallin or other fossil Body continue Fluid; but as the said Particles, do gradually decrease in motion, and at last cease, so doth their *Fluor* or Fluidity recede farther and farther from, and approach nearer and nearer to Solid, until at last it returns to its first Solidity. To go farther with you: Suppose you Melt a piece of Metal, whereof one part is Gold, the other Silver, and the third Copper, melt them together in a Crucible with an intense Heat; the upper part a top, which will be the Copper, is much thinner and more Fluid than the middle part, which is Silver; and the Gold in the bottom will scarcely be thoroughly melted, but broken into grosser parts. This is an ocular Demonstration of the manner of the Formation of the *Chaos*, imagining only the motion of Fire in the least proportion analogous to the crushing motion of the Creator, tho' incomparatively less forcible. The greatest violence of motion of the Fiery particles is upon the circumferential and superficial parts of the Metallin lump, and ren-

renders the Copper the most Fluid thin and transparent, which is Analogous to *Aether*, the Silver to Water, and the Gold to Earth.

37. All *particula subtilissima* being contiguous (such as *Cartesius* means in his imaginary formation of the univers) must by violent motion become continuous, thence most Fluid, and most thin, and thence *Aether*. This I do also plainly demonstrate by ocular Testimony. Gold or any other Metal being reduced by the violent motion of acid Spirits, as *agua Regia*, into *particula subtilissima*, or into ashes (which are the least contiguous particles) by calcination of those said Spirits, and being afterwards exposed in a Crucible to the quick motion of a violent Fire, do become Continuous, Fluid, and Thin. Consequently must those *Cartesian* contiguous *particula subtilissima* by being fused or melted become continuous, and much more or rather most Fluid, and most thin, by the most violent motion, that the Creator impressed upon them, which then is become *Aether*. Give me leave to repeat this matter; by the most unconceivably violent first motion of the Creator upon the Surface of the most Solid Mass of the *Chaos*; its superficial circumference was broken into Dust, or contiguous *particula subtilissima*, and by continuation of that most violent motion, the said Particles must be fused or melted into a continuous most fluid, thin, and most rarefied Body, which then must become *Aether*, and Transparent, by means of that rarity; in the manner of Ashes, that by the motion of a violent Fire of a Glass-House Furnace, are melted into a Continuous, most Fluid, most Thin, and most Transparent, that is, rarefied Body, and continues so to be, as long as the violence of motion in the Fire lasteth; but ceasing, return into an Hard, Solid, Thick Mass of Dark Glass, if it be in any great quantity.

city. So the *Aether* must, and doth continue such, as long as that violent motion in it doth last, which ceasing the *Aether* must return to its pristine *Chaos* again. *As* the 2. v. 20. The Grosser *particula* (as I have in another place expressed) being more remote from the Creators extrinsic motion, could not be subject to so extreme a Degree of Motion or Melting, were therefore converted into a continuous Body, but more Gross, less Fluid, Thin and Transparent than Air, which was the Element of Water, neither can those *particula subtilissima* being once melted into *Aether* ever return again to *particula crassae*, as long as that violent melting motion continues, which is exactly contrary to *Cartes* his Supposition, that the *particula primi, secundi, et tertii Elementi* are each convertible into one another. So that *Des Cartes* his imaginary Formation must of necessity be a *suppositum non supponendum*, and wholly incoherent and repugnant. Wherefore it must be very vain to conceive *Globuli majores*, or *minores*, (for which I cannot see any manner of necessity to suppose them) or any other Circumstance that belongs to his supposition.

39. To imagine that these *particula subtilissima* did get or crowd in between the contiguous *globuli* (that in themselves were continuous) and cause them to move violently about, is inconceivable; because if by their impetuous motion they could crowd in between, by the same *impetus* of motion they must immediately crowd out again. 2dly, It was impossible (if they had been lock'd up by four *globuli*) for them to have moved Bodies, that were much stronger to resist, than they to move. Besides contiguous least Particles being in the least resisted by any thing, that locks them in, their motion turns inward, so that one Particle moves the other inward that's next to it, and so on; contiguous that are heapt together;

ther, being apt very easily to give place to one another, as appears in a bag of Sand, being crush'd. Lastly, It was impossible, for those least Particles to move those *globuli*, being continuous, smooth, and without Pores; bycause there being no Pores to fasten themselves in, nor any external roughness to move themselves by, they must necessarily slide over by 'em. Why the least contiguous Bodies can have but little force, you will read in another place.

40. *All motions of immaterial and material beings are Passions*, in a relative Sense; And all motions of immaterial beings are actions, in a correlative Sense. Devils are moved through the Anger and Wrath of God into all manner of Torments, Angels and Pious men are moved and actuated in their Wills, and Understandings, by the Power and Goodness of God; as Devils, and Wicked men are moved by one another into Torments, and these Originally by Satan, or the Prince of Devils. God alone can primarily and properly be said to move actively; but improperly, metaphorically, and *ad captum humanum*, God is said to be moved passively by his Goodness (the name of God being derived from Goodness, and Goodness from giving, as *Deus a dante* rather than from *esse*) Mercy, &c. or to be moved by Prayers from Pious Men to Bounty and Compassion, and by the Wicked to Wrath and Vengeance. In like manner, Man in respect of his Will improperly, secundarily, and derivatively is said to move actively; but Men in reference to their Body, and all other animate, and inanimate beings, are properly said to be moved by one another; and improperly, primarily or primitively, to move one the other; bycause only properly, primarily and primitively the *Æther* can be said actively to move, and cannot in the preceding Sense be said to be moved.

in regard the *Aether* is the *primum* (and *primitivum*) *movens naturale*, but in respect to God, it is the *Primum mobile*. The Air is the *secundum*, or *mediatum movens naturale* in respect of all other Bodies next the *Aether*, in relation to which it is the *primum mobile naturale*.

41. This next preceding theorem, with the discourse raised upon it, amounts to no more than another, which I have several times repeated in different Words, viz. *Quicquid movetur, movetur ab alio*. Here you may observe the use of putting sayings, be they Axioms, Sentences, or aphorisms into different dresses, Modes, Fashions, or Habits, that will conduct you into various new Thoughts of things, in themselves very useful and pleasant; but first let me adequate those two Axioms. *Quicquid movetur* signifies plainly *omnis motio est passiva*; if *passiva*, it must relate to an *activa*, viz. *Aliud movet illud quod movetur*; whence its a clear inference, that all Motion is passive in one Sense, and in a relative opposite Sense all motion is active. Next I ought to explain, that the putting of a simple Notion or Word, complex Notion or Saying, never so little changed into any other Synonymous or equipollent saying, or variously applied, that is to various objects or subjects, produces the greatest use and Pleasure, that any Truth is capable of bringing with it; for instance, from saying all Motion is passion, and applying that saying to your Sense, and Understanding, you cannot in this passive Sense properly say, your Eyes see, or your Ears hear, &c. but you ought to say, your Eyes, Ears, Sight, or Hearing is or are moved into Seeing, or Hearing, by a Visible, or Audible object, which (viz. object) in an active meaning is that, which moves the sight or hearing. So in reference to the understanding you cannot in an active meaning properly,

properly say *intelligo* or *intellectus intelligit*, but *moveor*, vel *movetur intellectus ad intelligentiam ab idē sensibilibus*, which are the *moventia* in an active meaning; now in this passive signification you can go no farther; and therefore as the *intellectus* must be the *ultimum passivum*, so to return back again to the active, the *intellectus* is the *primum activum*, *agens* or *movens* as to us, and in us; then to say *intelligo* signifies *ago*, or *moveo Ideas intellectus*, and *Ideas sensas a communisensu*, and here you can go no farther; for you cannot properly say *Intelligo* (active) *ignem*; bycause your understanding cannot act upon the Fire or move it; so that you can only actively understand or move the *Idea* of Fire in your memory, that was made before upon the common Sense, and afterwards deposited in your Memory. Neither are any of the Senses capable of any active Sensation, as I said before, but are all passive. What has been hitherto discoursed concerning active and passive or action and Passion, is to be taken relatively between an *animatum* and an *inanimatum*. Between two or more *animata* its quite different; the Active between *animata* means passive, and the passive means active; to say *video Petrum*, that implys my sight is passive, and *Peter* is active; bycause the *Idea* of *Peter* moves my sight. *Petrus me videt*; here I am active; because my *Idea* moves the sight of *Peter*, who is now passive. *Videor a Petro*; here *videor* implys an active, bycause my *Idea* doth act upon *Peters* Sight, who is passive. *Petrus videtur a me*; here *Peter* is active; for he moves my sight, and I am passive. All which happens from the want of proper Words.

42. In respect of immaterials, the Intellect is moved either by God, Angels, or Divels. God moves our intellect by his attributes; Angels and Divels by their proprieties. Some of Gods at

tributes are peculiar to himself, viz. the highest understanding, the highest Wisdom, the highest truth &c. that is, all his attributes are superlative, or *in summo gradu*; others are derivative and communicated to materials as well as immaterials as moving or active (but as I said derivative) Motion, Power, &c. others only to immaterials. as understanding, will, which are common to rational Souls, Angels, and Devils; wherefore it must be a mistake in Philosophers to call only Angels *Intelligences*: others are common only to Rational Souls and Angels; are Wisdom Truth, Providence, Goodness, Love Mercy, Compassion, &c. The contrary of all which are peculiar to Devils, in *summo gradu* or in the superlative; as the highest folly, highest *Falsity*, highest Wickedness, highest Malice. &c. Before I proceed, an Important objection must be answer'd, viz. Wisdom, and several other attributes admit of no degrees of comparing; bycause Wisdom implies a Knowledge of all things, Divine and humane; for to *all* nothing more of Knowledge can be added; wherefore it follows, God is wise, and cannot be said properly the wisest. I must not answer, there is a perfect Wisdom, and an imperfect; bycause imperfect is a contradiction, for Wisdom must be perfect; or else it cannot be Wisdom; besides it must be thence inferred, that God being perfect can Create an imperfect being, which is a contradiction likewise, wherefore it must follow, that neither Man, nor Angels can be said to be wise, much less, one Man wiser than the other, as commonly we do say he is. Its answer'd, God hath Created a Man, and an Angel perfect, according to the capacity, which God had Decreed for them. Now according to the Axiom, *quicquid recipitur recipitur ad modum recipientis*, Man hath received a perfect Wisdom according to his capacity, which God hath limited

ged to him; And in regard that some Men are Born with a greater capacity than others, thence it is, that some Men are said to be wiser than others. In this Sense it is, that God in respect to his highest Capacity, is said to be highest in Wisdom, of all immaterial Beings, &c. In this Sense all immaterials do admit of comparison. Some Devils are more wicked than others, and under greater Torments than others; and some Angels consequently must be of higher Wisdom, Degree, and Dignity than others. Wherefore God being of the highest Capacity (*pro capite humano*) is by us said to be highest in all his Attributes. Next I am to prove, that the Intellect is capable of knowing God in a great measure by his Attributes. The comparing of the *Idea* the light of a Fire makes upon my Senses, and common Sense, and by them upon my Intellect, with the *Idea* of day Light, doth make a complex *Idea* or inference in my Intellect, that day Light issues from Fire the highest or greatest; though I never do see the Sun, yet I must infer the Sun or any thing else, what ever you will call it, is the greatest Fire; because it makes the greatest Light. By the same manner and way I make an *Idea* of the Wisdom, Providence, &c. in Man, and making a comparison with another *Idea*, impressed upon my Intellect, by observing, that there is a Providence and Wisdom, not only greater or higher than that of Man, but the highest, which is the *Idea* the intellect according to its capacity can make of God. That there must be a first immaterial Cause, is sufficiently prov'd by some of the foregoing Theorems; if then in my intellect I unite that first immaterial, to the highest *Idea* (of Wisdom, Providence, &c.) framed by my intellect, as is said before, that exhibits to me a greater and stronger *Idea* of God's Attributes. Or thus, The *Idea* I make of the greatest light

in the Universe, must necessarily give me an *Idea* of the greatest immaterial Light, that was the first cause of the greatest Light of the Universe; bycause that greatest Light could not make or cause it self, but must be caused by the first and greatest immaterial Light, which is God. If you affirm a Material Being must be the first cause of a Material Being, than the World must be infinite; for one material Being would be the cause of another, and that of another, and so *ad infinitum*; but in regard we do observe, that all the parts of the Universe and their Proprieties are *finite*, it must follow, that the whole or *totum* must be *finite*; wherefore it must be an immaterial Being, which is beyond *finite*, must be the first cause of all *finites*.

43. In respect to Immaterial Beings, the intellects and Wills of Men are moved by God, Angels, and Devils into immaterial *Idea's*; if true by God, or Angels; if false and deceitful by Devils. Wherefore if Devils have a Power to move the intellect falsely and deceitfully, as Holy Writ affirms, and we every minute do experimentally find, I leave it to Divines to determine, whether we ought not necessarily to allow the same Power to Angels, to move the intellects of Men truly and faithfully, and consequently, whether every Man, that is, every Rational Soul must not have an Angel attending her understanding, if she will yeild to be mildly and benignly conducted by him into Truth; and a Devil, if she chuses to be hurried into all manner of Falshoods and Deceits: Or whether it be more consentaneous to the Holy Scripture, that God immediately by his Holy Spirit doth move every Man to Truth, Goodness, and Piety, that will hearken to him, according to St. *John*, Ch. 14. verse 16. also Ch. 15. verse 26. 2. to *Cor.* Ch. 13. verse 13. *Acts*, Ch. 2. verse 38. Those Angels are said to be moved

moved to attend every one of us by the transcendent Love of God to Man: And Devils are moved to attend us by the Justice and Wrath of God for the Original and actual Sins we daily commit. Our Wills are moved by Angels to Good, and by Devils to Evil, and all manner of Wickedness; but then it follows, if God's Justice and Wrath doth by far exceed (for there is no comparation in God's Attributes, which are all equal in the highest degree, but this is spoken *ad caput humanum*;) his Love and Mercy; a Man being much more prone to Evil, and committing many more acts of Evil than Good, must consequently be much more oft moved by his Evil Spirit, or Devil, who is moved thereunto, by God's Justice and Wrath; But on the other hand, God's Love and Mercy doth beyond all comparison excel his Justice and Wrath, by having decreed and granted to him a Saviour *Jesus Christ*, estimable beyond the Capacity of all Thoughts, which doth retract the Scales, and turn it intirely to the other side to Man's inexpressible advantage; so that God doth much more, or rather always move Man's good Angel to move him to things, that are true and good, if he will but hearken to that good Angel, and be directed by him; but *ex diverso* if he inclines more to his Evil Spirit or Devil, as it may be feared the greatest part of Man doth, then *pro tanto* all what he undertaketh, must be false, and whatever he willet must be Evil. The Devil of every Man useth these steps: 1. He persuades him, that Self-love, Self-preservation, Self-design, and interest must be the basis of all his Voluntary Actions. 2. That all his Actions ought to be moved by Self love, or Self-preservation, or fear, anger, malice, hatred, &c. Then it follows, that most Children do love their Parents; because they feed 'em, bring 'em up, and preserve 'em, as a Dog loves his Master, or

a Cat her Mistress. When Children are advanced to some knowledge or capacity; then they love their Parents for fear of being beaten, and only obey them out of the same fear, and not love. But when they are arrived to some kind of Maturity, they perfectly hate their Parents, and wish them dead a thousand times, now they think, they can preserve themselves, could they only attain to the possession of what they hope their Parents can, and will leave 'em; or if they have nothing to leave them, they fear they may become a burden to them, or some impediment to their advancing themselves, or a rebuke to some of their inordinate Passions, or Vices, as Pride, Luxury, Debauchery, &c. The like mutual pretended Affection is applicable to Husband and Wife, elder and younger Brother, Man and Man, hate each other like Divels, or Wolves, but seemingly pretend to love each other out of Self-interest and Design; one Man naturally is apt to speak against every Man he knows, and most apt, willing, and transported with Joy to receive an ill Report, spoken of any Man to him by another, and is commonly so far from damping of it, that immediately he adds to it; by making that Report ten times worse, and then he fancies himself pleased. To love one another, to speak well of one another, or so much as to be mannerly one to another, is quite contrary to the corrupt nature of Man, who may aptly enough be compared to a rotten nasty Underwood of Shrubs growing in a stinking Morass, where each Shrub by attracting the sap or food of another, indeavours to lessen it in its growth, and starve it to Death, and by outgrowing it to shadow it in utter obscurity, as every Man by attempting to acquire Fame or Honour, uses his greatest efforts to make all Men appear little, base and obscure; back bite, and rayle as much,

safe:

safely and as privately as he can, to prevent himself from being known the first Author, lest another that is so calumniated should revenge himself by returning the Scandal upon the Calumniator with Interest, and Surplusage. But a Man who is pious, truly religious, and willing to submit his understanding and will to be moved by his Almighty God, and his holy Spirit, praises his God, and speaks well of all Men out of a principle of Truth, and is most ardently desirous every minute to quit his Residence in this stinking Morass of the World, and its rotten nasty Underwood of Shrubs, by dying the Death of the Righteous. If a Man has but the least spark of Piety, he is at all times willing to surrender his Fame, his Honour, his fine Palace, his delicious Garden, his Lands and Riches to the Survivors of this impious World. It is not within my province to advance farther into this Subject, but resign the residue to Reverend Divines.

44. Many immaterial Beings though we cannot immediately know them by our Senses, we may know them by a comparative knowledge, and by Mediation of our Senses. We know experimentally, that the Sole universal or general Action of the immaterial Rational Soul in the Humane Body is her actual Will; and so oft as she wills, she acteth, and what ever she wills, is acted, obeyed, performed and executed by the Body (as to what ever is in its capacity) at that very instant she wils or acteth; thus, if she wills to stir or move from one place to another, the animal Spirits, that are her subservients, move by means of the Muscles all the Joints (*artus*) and by them the whole Body, at the very same Instant (without the least interval of time) from one place to another, whither the Soul willeth. If she Soul wils to stir only one Joint, or Arm, Leg, Finger, Toe, or any particular moveable part,

part, as Lip, Eye-lid, &c. that Joint or part is only stirred, and no other at that very instant; & *sic in cæteris*; all which to consider seriously, is the most wonderful thing of any in the World.

45. As the Will is the Action (*actus*) active, and practical part (or faculty) of the Soul, so is the Understanding the Passion, passive and theoretic part (or faculty) of the Soul, which ever precedes naturally and ordinarily the Will; for violently the Joints or whole Body, or part of it may be stirred or moved in Sleep, or by a Disease, as Convulsions, &c. without the consent of the Understanding, or Will; of which I have discoursed more amply in another place.

46. By comparing the Will and Understanding of the immaterial humane Soul, we may, and do know the manner and action of the Wills, and Passion of the Understandings of the immaterial Angelical and Diabolical Beings, which is by their Wills through means of the Air, (which in the Sense here assigned, and in the Universe, is their Body, and their Subservient, whence the Devil is called the Prince of the Air) they Will to be at such a place from such a place; soon after they are there; bycause their Mundane Body, to which they are united, as the Soul is to her humane Body, is moved by their Wills instantaneously, as the whole humane Body is instantly moved by the Will of the Soul; and as their Wills, which are their actions or motions, are instantaneous in reference to material places, their Actions or Wills must be the same (or more instantaneous, if it were possible to conceive) in immaterial places. As I have shewed in another Paragr. that the extent of immaterial Beings is limited to immaterial places, they are much more limited (if possible) as to material places; wherefore those Beings are united

to material Bodies in such an extent, as God has decreed to be proportionable to the capacity of their immaterial extent, in the manner as the extent of the humane Body is proportionable to the extent of the Rational Soul. Hence it follows, that Angels and Divels can only move their Aereal Bodies gradually and successively, as the Rational Soul moves her humane Body from one place to another; consequently also, an Angel, or Divel cannot in an instant by their Wills move their Aereal Bodies from hence to the *Indies*; though we must conceive, that their motion is many million times swifter than that of Rational Souls. I do also apprehend, that those immaterial Beings whilst they are within the Universe, are as much and as properly united to their Aereal Bodies, as the Rational Soul is to the humane Body. But how is she united? She must be continuous with her Body; not contiguous; for then she cannot be said to be united.

47. But for the present I shall recommend it to the deep knowledge of Reverend Divines to explicate the *modus* and *vinculum*, whereby the Rational Soul being immaterial, is joined to a material Body. Lastly, as the Understanding of humane Souls is capacitated to understand most natural, and many supernatural things truly and certainly, though it seldom doth; so the Understanding of Angels doth always understand all things Divine and humane truly and certainly; but Divels do understand all things falsely and uncertainly. The same may be said of the Wills and actions of humane Souls, Angels, and Divels. The first natural acts or wills all things evilly, maliciously, and deceitfully; but being moved by God and his holy Spirit or Angel, wils or acts all things to a good end, without the least wickedness malice or deceit. The Second wills and acts all things more perfectly accord.

according to a far higher and greater goodness, and bright shining clearness, or candor. The Third will and acts all things most wickedly, maliciously and most deceitfully. Touching the ministerial Office of Angels, and the instrumental part of Devils, I have given some Hints in another Paragraph before. Wherefore shall insist no further on it here, having given my self an *Idea* of the Essence of Angels humane Souls, and Devils, to some sort of Satisfaction; as I do wish it may be in some degree satisfactory to others: But since I am upon Wish, it gives me occasion to wish three Things, viz. 1. To see a Divine, who exactly and exemplarily doth will and act according to what he teaches. 2dly, A Lawyer, who advises his Clients in Law Suits, that are indifferently only contraverfial, to what he would act himself, under the same Circumstances, and 3dly, A Physician, that doth remove all those Diseases, he pretends to Cure; and to such a Divine I would gladly become one of his Flock; to such a Lawyer one of his Clients, and to such a Physician one of his Patients.

48. *Terminus* comprehends a *Præception* and a *finis*; the former is called by *Logicians terminus a quo*, and the latter *terminus ad quem*, and both these *termini* or boundaries of corporeal Beings, are tyed together by continuity or continuation. So that all Bodies of and within the Universe, in respect to the *Chaos* (which has no ending; for the *Chaos*, though it be actually now formed into this Universe, yet the Universe is still a *Chaos* in *potentia*) must have a beginning, continuation or have continuity, and ending, or be *finite*, and consequently *definitive in mente ratione* or *intellectu*. God hath neither beginning, continuity, nor ending. Angels, Rational Souls, and Devils have a beginning, no continuity; but therefore have no ending. What has no continuity hath no matter,

matter, Body, or quantity, and therefore they must be immaterial, incorporeal, and inquantitative. God alone is interminate, *simpliciter & absolute*, without beginning, or ending, from which he is called, *Aeternal* or *Sempiternal*; *Aeternus* being an adjective form'd from *aet* *semper*, where of *sempiternal* is an Adjective, as *Externus* and *Internus* are Adjectives from *extra* and *intra*. *Semper* is a Word compounded of *Sine* and *tempus* i. e. *Sine tempore* that is, *extra omne tempus*. Angels, Souls, and Devils are infinite, as having no end, and interminate *ex parte*, and *Secundum quid*, having a beginning but no end, all which will be repeated below with some addition. from the force of this Paragraph I may assert, there can be no *infinite* nor *indefinite* within the Universe which latter the great *Des Cartes*, doth erroneously introduce into his Philosophy, as he doth the former, *viz.* infinite, by affirming that motion can never be lessened, much less cease or annihilated, and consequently corporeal motion must be *infinite*, which Saying is Atheistical and impious. I am almost confident none of his Disciples can extricate their Master out of that difficulty, nor out of an Hundred more. Suppose its objected by them, that a single round point without continuation or the addition of another, is the beginning of a Line (which I deny) but it hath no end. Its answered a globous corporeal, or quantitative and least determinate point hath a beginning and ending, it is bounded by its circumference from one side thro' its center to the other side, that is by its diameter; but this will be made more plain in another place. Nature may be said as much or more to abhor an *Infinisum* or *indefinitum*, than a *Vacuum*.

49. There have been three Sins committed, the one against the Holy Ghost (the other two almost as grievous) which was unpardonable by God; because the pardoning of it must imply

ply an imperfection, which cannot be imagined. That Sin is unpardonable, for the committing of which, the Wrath of God cannot be appealed; and therefore God utterly excluded that Sinner out of the most transcendant merits of a Saviour, whom God out of his highest Mercy and compassion, only decreed for Man. This Sin was the highest Pride in the highest of Angels, who through the height of his Pride aspired to seat himself in God's Throne, for which unpardonable Sin God moved thro' his greatest Justice and Wrath deprived him of his presence, and cast him into an infinite Hell, beyond all hopes or possibility of Redemption. He is therefore called *Diabolus* (from *διαβάλλω* *abjicio*) and *Divel* from *Diabolus*) or a cast off Angel from the brightest Light, which is God's presence, into the most remote and darkest Dungeon. Moreover God declares his highest Hatred and Wrath against all Pride, and arrogant, fierce, proud Men, thro' out the Holy Scriptures, and his great love, mercy, and compassion to the meek, humble, and humble-hearted. Wherefore it highly behoves all Men to take notice, of how dangerous a consequence the Sin of Pride is. A dignified proud Man is certainly the most impertinent of Fools, to pretend to set himself above any of his fellow Creatures; besides in depriving of himself from being informed by the conversation of his Inferiors, as he was a Fool, so must continue; neither would a measured familiarity or deportment in the least abate the respect, honour, or distance that is due to him, from his Inferiors, whose default in that point is in his power to punish by forbidding them his presence, and disdain or scorning them. A proud Man is a meer Bladder blown up with vanity, or a bubble of empty nothing, a lump of Ingratitude towards his Maker, and the Scorn of all Mankind; A most unjust arrogant Judge of his
own

own merits, an hardened Fool in his Understanding, and a fierce wild Beast in his voluntary actions.

50. There are two Sins more, that from God's most just and severe punishment of them, must be stiled the next greatest; viz. Ingratitude, and Stubborn Atheism; the former was punished in Adam, arising from his Disobedience to God, by casting him from the greatest Happiness he enjoyed in the Garden of Eden, or terrestrial Paradise, into the most dismal, and particularly by God cursed Condition of plowing this nasty morass of Earth, made noisom and stinking by the bog of Waters and the Salt Sea. The stubborn Atheist, who most impudently and most ignorantly gives God the Lye in his Essence, all his Attributes, and in his most sacred revealed Word, is scorn'd from God, and ought to be so by all Mankind, and can expect no other reward than infinite Damnation. However Gods mercy through a most inestimable (*Jesus*) or Saviour, has most mercifully render'd these two latter most deplorable conditions redeemable; but Pride is beyond all redemption. An ingrateful Man comprehends all the Vices Morality can accumulate upon him; *Ingratum si dixeris omnia dixeris*. An Atheist is a Fool in his heart, proclaimed such by the Sacred Pages, and the most ignorant of all Men, in being incapable to receive the least *Idea* of an immaterial Being in his Understanding. From a proud ingrateful, and Atheistical Wretch, Good Lord deliver us.

51. All Sins are Mortal, and punished with infinite Damnation; and therefore no Sin or Punishment can be Venial, and Sold by a *Janus Trifrons*, or a tripled *Hydra*. and his purpled Hinges (*Cardines*) of Pride, Luxury, Ingratitude, and Atheism. *Idi omnia sunt Venalia*. There is the publick Mart, or Catholic Market, where Punishments for Incest, Promiscuous Whoring, Perpe-

Perpetual Drunkenness, Gluttony, Oppressions of the Poor, Rapine, Murther and Treason, may be bought and Sold at a fix Price; and I much question whether a Pardon of the Punishment of those High Crimes, that cry out aloud to Heaven for Vengeance, cannot be bought *a Priori*, before they are Committed, that is to say, whether a Licence to Commit them, may not be bought at the same Price, which properly are *Indulgences*, or *Permissions*; and the others are not.

52. Before I leave this Subject, I ought to insert an Important Objection (which was forgotten) against the premised maxime, viz. *Quicquid movetur, movetur ab alio, etiam in immaterialibus, Deo Unico & solo excepto*. It may be Objected by way of Query, that the understanding in making or forming an *Ens rationis*, as a Tartar, *Hippocentaurus*, or making purely mental Propositions which are Complex *Ideas*, by dividing them in sunder, or joining them together several various ways makes inferences and Conclusions; what is it in the recited Instances, that moves the understanding? If its Answer'd, the *Ideas* move the Understanding, which are in the Understanding, then its replied again by another Query, what joins those *Ideas* together, and what doth separate again one *Idea* from another? its Answered again, the Understanding; but then what moves the Understanding to join, or divide them? It cannot be the *Ideas*, bycause they cannot move the Understanding to join or divide themselves; wherefore either we must grant that the Understanding doth or can move it self in forming Identities, Differences, Conclusions, Discourses and Complex Notions, without being moved; but then this Repugnancy follows, that the Soul in that respect is equal to God, who only can and doth move himself, and consequently in that Sense, the afore said Axiom of *Quicquid movetur, &c.* doth

doth only hold true in all material Beings, or else if we will avoid the foresaid Repugnancy, we must necessarily grant, that all immaterial Created Beings are moved by God (bycause all motion can only begin Originally and Principiately from *one*) and cannot move themselves. What can move the Divels in Hell to Torment, but God by his Wrath? For it is not to be imagined, that the Divels would torment themselves, no more than a Man would put himself to pain. What can move the Angels to those unspeakable Joys, ubt God? Besides, it's most reasonable, most just, and most pious for us to believe this to be so, and its most consentaneous to all the Doctrine of Sacred Writ, expressing, that God is the mover of all in all; he is the beginning and ending of all; the *Alpha* and *Omega* of all, besides hundreds more of the like expressions throughout that Holy Systeme. The Objection, that God according to the premised Discourse, must be the Author of Evil, in moving Wicked Men to Wicked acts, is but very indifferently answered, by asserting, that God doth not move, but only permits and suffers, being Words both contradicting each other; for if God permits, he gives Licence, and actually moves a wicked Man; if he suffers, it implies a weakness in him; so that we ought rather to say, that God doth move through his Justice and Wrath, the Divel to move every wicked Man to commit Evil, which is part of the beginning of Punishment a wicked Man doth undergo, being inflicted from the Justice of God immediately upon him; and as his Wickedness doth daily increase, so the Punishment doth daily increase with it, until he is arrived to a total, or height and consummation of Wickedness, which God's Justice doth then punish with Damnation, that being the total, height and consummation of all Punishment. But on the other hand, you must

also believe, that God through his mercy, pity, and compassion, by his Angel, that attends every Man, doth also move him to Good, Vertue, Piety, and Obedience, if he will hearken to it, and rather consent to be moved and assisted by him; which doth most certainly imply there is a Free Will in Man though not absolute, as it was in *Adam*, but *Secundum quid*, which inclines him rather to Evil than Good. This distinction seems in some wise to comprize a solution or decision of the Controversy, that is between the *Aminians* and those of the Orthodox Church. 2dly, The premised Discourse doth explain God's promptness and readiness to punish a Sinner, which ought therefore immediately to divert him at the very beginning of any Sin. 3dly, This promptness of God's Justice, in punishing a Sin as soon as it is committed, doth not contradict his highest patience and long suffering the Sacred Scriptures do so frequently repeat, because that refers to Damnation, for if every actual Sin merits Damnation, certainly God's deferring of Damnation so long, doth render him most patient and long suffering. 4thly, God thro' his Justice and Wrath, doth move a whole Nation, People, City, or Town, to fall into great wickedness, and by the same Justice and Wrath, he doth punish whole Nations, and Cities by utterly destroying them, as he hath destroyed in ancient times, *Affyrians*, *Grecians*, *Medes*, and also *Sodom*, *Gomorrha* and many others; and may still continue to punish a Nation in the same manner, that aspires to an Universal Monarchy, thereby striving to rob the great God of his Power over all Nations. To conclude the Theological part of this treatise, with an important admonition of seriously considering, that God is the only first and principal Agent, Movent, and Intelligent of all Beings, and that God is pleased out of

of his highest goodness, mercy, and compassion, to be moved by most humble Prayer and Supplication, We, and each of Us, ought most humbly to beg of him to move, direct, and conduct Us, and each of Us, by his Holy Spirit, in all our Thoughts, Words and Actions, and to make Us sensible of his greatest Goodness, Love, Mercy, and Compassion in creating Us, preserving, and saving us from Damnation, to all perpetuity, by returning to him all our Affections and all our Obedience out of a due Love, rather than out of fear, and rather out of fear, than to be utterly, unjustly, and most wickedly ingrateful; which ingratitude all Men, and more particularly the most wicked of Men, are forced to own and confess out of their own Mouths, that God is most just in punishing it in a most equitable manner with perpetual Damnation, or casting the ingrateful wretched Man from his most bright and glorious Presence into the remotest, Darkest, and most tormenting Hell. This condition I cannot term miserable; for neither God, nor Angels, nor pious separated Souls, can be moved with the least Compassion towards those, who thro' their utmost ingratitude are become Devils:

52. *Wisdom and Wise, Wit and Witty, Ingenuity and Ingenious*, are Words commonly used, whose Sense is variously understood by most, and by many very erroneously. All these Words according to the several ways of considering them, belong to *Metaphysics, Physics*, and moral Philosophy. Wisdom in a large acceptation expresses Knowledge in general, whence vulgarly a knowing Man is term'd a wise Man. In the narrowest signification and metaphysicaly Wisdom implies Theology or knowledge of God, his Essence, and his Attributes; and if more largely consider'd, comprehends also *simpliciter* a knowledge of Angels, separated Souls, and Devils; and relatively to Man, of God's Com-

mandments enjoined upon him, and his Duty to obey them, &c. the Knowledge of all which is, and ought to be accounted the highest Knowledge, and true Wisdom; whence only the Godly and Religious Man is accounted a Wise, or rather the Wisest Man. Sometimes Wisdom is understood for the Knowledge of *Metaphysics*, which thence is defined to be *Sapientia entis ejusque specierum, & proprietatum*. Very oft Wisdom in a large Meaning is taken for the Knowledge of many things, and thence he is called a wise Man, viz. from knowing many things; but in the largest Acceptation, Wisdom is the knowledge of all things divine and humane, as far as a Man is capable of understanding them; and therefore Philosophy is called Wisdom, and Philosophers wise Men. In respect to Morality or *Ethics*, Wisdom is oft understood for Prudence, and a wise Man for a prudent Man, whose actions being directed by the foreknowledge of things, and thereby the Event or end proving happy, renders a Man prudent and Wise, that is, a Man Successful (not casually) but intentionally, through his proper foresight of the event of things. All these acceptations are answered by their contraries, viz. Ignorance, and Folly, promiscuously. As in Holy Scripture a Man is called a Fool, that is, Ignorant of Divine things; likewise he is called a Fool, that knows little, or is imprudent and unsuccessful. Now as Wisdom relates only to the specific difference, and first propriety of Man, viz. *Rationality* so Wit is referred only to *Risibility*, or the Second Property of him, wherefore Wit must be termed in the largest signification to be, what ever doth or can make a Man pleasant, smile or laugh, in Thought, Words or Actions. Thus a Man may be termed Witty, when he is moved into a smile, or laughter by and in his own thoughts and merrily conceits. Hence *Democritus* may be called witty.

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witty in his Thoughts, from making himself laugh by his thought of all things to be Folly; though according to that Sense, *Heraclitus* must be termed a Fool in his Thoughts, from crying or bemoaning at every thing he perceived by his Senses, that moved his Thought. On the other hand, Madmen ought to be called Witty, when they laugh at every thing, and Fools when they cry at every thing, of which two sorts, one might judge the whole race of Mankind doth almost consist. He that by uncouth Words, odd Sayings, musical Rymes, sudden Punns, pretty Catches, short Stories, quick reparties, pleasant Tales, merry Jests, &c. can, or doth make a Man pleasant, smile, or laugh, is by most Persons accounted a witty Fellow, and his Company is covered, courted, and caress'd, with Wine, or any other Entertainment agreeable to him by the bulk of Mankind; but especially if to his Words he can add comical, foppish, antic, and very uncommon Actions, he must and will gain the laurel of being esteem'd one of the wittiest among Men; and consequently a *Frenchman*, (I mean a great part of them; for some are as wise as any of any other Nation, and the like I mean of *Spaniards*) must be the *Cesar* of Wit, as appears by observing at any time two of 'em meeting together; in the next minute, by their words and actions they seem extraordinary Witty in moving each other to Laughter, and very oft do continue Wit to each other during their whole Conversation, and commonly as they meet in Wit and Laughter, they do as commonly take Leave of one another Witrily, that is, Laughingly. But a *French Man* as Witty as he is, exceeds his own Wit, at Church for joy of seeing his Mistress, and at his Meals, for joy of cramming his Gut. To remark a *Frenchman* at his Church Devotion, upon his Knees, with his Legs laid in a witty posture, his Body in a variable witty figure, his Eyes wittily

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owling from his Mistress to the Altar, from the Altar to his Beads, and from his Beads to his Mistress, and during all this Conflagration of Wit, the poor Beads are in a constant Storm of motion. At Table, Monsieur is admirably Witty in his Thoughts, words, and Actions; his whole Body, his Tongue, and his Legs under the Table dancing a Courant, that keep even time with his Mumping, and therefore should *Democritus* and *Heraclitus* have seen *Gallus* at Church, and at Dinner, the one by bursting himself with Laughter, and the other murdering himself with Crying at the Wit of a Monsieur, they would most certainly have disturbed the whole Company; neither would they have done less at the Wit of a *Spaniard*, expressed by his measured Steps, his broad proud Rust, long Bays Cloak, long steel Spade, and round toed Shoes, answer'd by his short bob Wig, and his flat parmasan Hat; his upper parts being dressed diametrically contrary to his lower; his articulated Words, metrical Sayings, and Statue like deportment of Body, his Eyes perpetually on a long Journey from the Earth to the Heavens, and thence backward and forwards; his whole Habit so antic, would give occasion for a controversy, whether a *Spaniard*, or a *Frenchman* is the most Witty, and tho' the latter has at present outwitted the former, yet its possible the latter may in its turn outwit the former, before he has served a quarter of his Apprenticeship. But what need is there to run so far for Wit, when we may find it in every *Baboon*, *Monkey*, *Buffoon*, and *Jack-pudding*, who by their Witty Actions can, and do make us laugh to all excess. If you Travel beyond those witty Nations into *Holland*, *Germany*, *Sweden*, *Poland* or *Muscovy*, all Wit is lost and none to be found, those People being as seldom moved to Laughter by any Wit among them, as *Apollo* himself, and that is once a Year, and for that reason, the two former are as much outwitted by the

the most Witty *French*, as the Witty *Spaniard* is. The *English* being Seated between these Witty Nations, and those others of little or no Wit, but of a great deal of Wise seriousness, to what share of either they can lay claim unto, may easily be adjusted, *viz.* that they have a mixture of some Wise Seriousness with some true Wit, which latter is very different from those Wits beforementioned.

54. True Wit is a compound or just mixture of Seriousness and Laughter (that is) it is Knowledge expressed by Thought to our self, Words, or Actions, in such a manner, whereby a Man is justly moved to pleasantness, smiling, or laughter according to the degree of Wit. Thus *Ovid*, *Virgil*, and *Horace* were adjudged very Witty, because they expressed the Knowledge of many things in Rithme or Verse, in such a manner that moved a Reader either to Laughter, Smiling, or Pleasantness, which last I take to be the lowest degree of risibility, and proceeds from a Titulation of the Mind; which if much Titulated, she breaks into Smiling, and if very much, then bursts into Laughter. A Fool may be moved (but not justly, or for any true reason) to Laughter by what seems to him Witty; which perhaps to a Man of Sense doth not appear in any reason to be Witty, and consequently will not move him to Laughter, or the least Pleasantness, whereas a Fool may be moved by it to Laugh, until he lyes down. Since I am casually fallen upon this subject, I would inquire, what is the contrary to Wit. It cannot be a no Wit, because they are contradictories; neither can it be Folly, because there are many Witty Fools (and Fools are oft called Wits, because they move others to Laughter) and Witty Divels: Then it must be that which destroys Laughter and Pleasantness: which is, sadness of Thought, Words, or Actions, that

are so far from moving to Laughter, Smiling, or Pleasantness, that they cause the contrary; and yet the relation of a dismal melancholic Story, may be so couch't, that it appears Witty, or moving to Pleasantness or Laughter; but that doth not proceed from the subject it self, but from the accidental placing of the Words, or Sense of 'em in such a manner, that they may be Witty and move to a Smile.

55. I do much question this *Philosophical description* of Wit, bycause it proceeds from one, who never pretended to the least share of it actively (though perhaps too much passively) but intirely had, and hath an hatred against it, and therefore the description is only conjectural. A Poet is a Professed Master, Maker or Former of Wit; his Opposite is a Romancer, who delivers the same subject in Words, that will not move to Laughter, though if accidentally he doth, for so much is he accounted to be a Poet, they being both nearly related. A Poet is born so, and so is Wit born with a Man; for its scarce acquired; and if it be, it is easily distinguish'd from the Native. Wit is a Property of the Will (whence derives the Proverb, he has Wit at will) as Knowledge is of the Understanding. After all this *lana caprina*, these Theorems do follow. 1. That Wit is for the most part casual, and doth accidentally fall into a Man, who at his first Speaking, or Writing could not design it, where and when he should meet with it, and casually it oft brings with it a Knowledge, whereof he never dream'd of, and therefore is of much less esteem then design'd Knowledge. 2dly, It is not lasting; for he that has been once moved to Laughter by Wit, is hardly to be moved to Laugh (but only to Smile) the second time, and the third time it vanishes, and appears no Wit at all, whereas the same Knowledge is always acceptable to a Man,
3dly,

3dly, Witty Men owe much to the Soil of being born such; for its thence whole Nations are born more Witty, more Crafty, more Suttle, more Knowing and more Serious than others. Though Parents may propagate something of it, and in that particular Bastards (generally speaking) are more witty than others, as also Squint-eyed: Hundreds of Deductions more may be formed for the premisses, but I am tired, by insisting so long upon Feathers and Nut-shells. I shall only say, that ingenuity imports no more than a pregnancy of sharp inventions, and he is termed an ingenious Man, that abounds with acute inventions, whether they relate to Words, or works. But in conclusion give me leave to tell you, that those Men that are Witty in the forementioned large Acceptation, are seldom wise, ingenious, or rich, and therefore such sort of Poets are commonly poor Divels, and of little value to any, but to those that are Debaucht; they understand little else besides Buffoonry, and have scarce invention enough to find out how to mend their Breeches, or Stockings, which is a great defect in those, that so often ly rough; they are Lazy, Louzy, Lewd, and Luxurious Companions, Debaucht to all manner of Vice, a burden to the Earth, and a curse to Heaven. And most certainly its a Fault in School-masters, to put young Lads to weave Witty Theams and Verses, that may indanger to break those soft, fine, tender Filaments of their Brain, or at least displace them, whereby ever after they must become dull Fools, or distracted.

56. After all, Wit and Witty seem to imply something more, which is not easie to be expressed; so that besides Knowledge, there must be a casual ingenuity, or intellectual invention that's acute and true, either simple, or complex, added to Pleasantness, to make up Wit or Witty; for if
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it be dull and false, it's no Wit. In short, we cannot say any thing is this, or that, unless the plurality of Men do agree to a certain rule, or stander, and that must be this, that *In omni genere oportet ut aliquid sit primum*. Without this Rule all contradictions, or contradictories may be render'd equally true, and what seems acutely and truly ingenious, or witty to you, may appear to me dull, blunt and false; and so in all other contradictions whatever, and we cannot arrive to any kind of Knowledge without allowing of this Rule. Risibility doth not consist in the grinning of the Face (or else a Dog may laugh in a *spasmus cynicus*) but in the pleasure, or pleasantness of the Mind, following Rationality as a Second Property of the *Ratio humana*, though the power of Speech or Speaking, that is, *locutibility* is rather a Second Property; bycause whatever can speak, must be a perfect Man, or a Rational Animal; and therefore if some be born Dum, Deaf, or Blind, they are not to be accounted perfect Men. In like manner Latrability in a Dog, Boability in a Cow, or an Ox, Hinnibility in an Horse, &c. are all Second Properties immediately following internal Sensation, or rather Sensibility in Beasts, and even those seem to convey pleasure or Pleasantness with them, as appears in the neighing of an Horse, or boing of an Ox upon the sudden meeting of another Horse, or Ox. I do infer hence, that Risibility, Boability, Latrability, &c. are essential and distinguishing properties, but their *actus* are casual. So that if an Ox could bark, he is no longer to be called an Ox but a great Dog, and so of the rest. In fine, Risibility, Wit, and Witty are Vanity and time lost; whereas as only true Knowledge is to be esteemed; so that I have been vain, and lost my time in describing Wit, Risibility, and Latrability.

57. God alone is Interminate and *Æternal*, that is, he hath neither beginning nor ending, in respect of time, he is the Sole increate immaterial Being; but God alone is not infinite, that is, having no end; bycause all created Beings, as Angels, Separated Souls, &c. are infinite also. 2dly, The Sole increate Being, and all created Beings, whether material or immaterial, can only be called infinite, but (the first excepted) not inprinciple; bycause they have a beginning, and therefore they are named infinite. 3dly, All formed Beings are terminate, that is, are principiate or have a beginning, and finite, or have an ending. What difference there is between increate, created, and formed, you do read in the Philosophical explication, made upon the first and second Chapter of *Genesis*. The *Chaos* is probably a created infinite Being, it had a beginning, but its likely never will have an ending, as you will read elsewhere; but all Beings formed out of the *Chaos* have a beginning and ending, and therefore are called terminate Beings. Continuity is either Primitive, or Derivative. The former is without parts, nor doth consist of any, such was the *Chaos*.

58. Derivative Continuity is the union of parts to (or with) each other; it follows, that all compound Bodies be they never so small, are continuous; bycause all Bodies are *tota*, and therefore must consist of parts, or Particles united one to the other; Divide a Secondary continuous Body into never so many lesser or least Bodies, you cannot divide them into incontinuous, and as soon as parts are divided, they are no longer parts, but *tota corpora*: Every drop of Water is as much a *totum*, as the whole Ocean. Continuity is manifold. 1. In respect to motion and time, which is an union of the parts of motion and time. 2dly, In reference to a quantitative Being, or a Body; corporeal quantity,

quantity, corporeal extension, corporeal continuity, mensurability, union, corporeal *totum*, and many others are different sounds of Words, but importing all the same Sense, under several modes only ways and respects, or relations, which the Understanding apprehends, relates, and applies to the same thing. Quantity, or bigness and littleness, also extension refer to an external place, that is thus, a bigness, or littleness takes up so much or so little place.

59. Extension signifies spreading over so much, or so little place. Continuity means a containing so great, or so little place, without being divided, and measurability so great, or so little place, as it measures, or is equal unto.

60. Quantitative union being spoken in reference to Parts (a Word derived from) *partibility*, that is, divisibility, or separability, implies the making or joining of two or more parts into one, which signifies a *totum quantitativum*! Now what follows? All Bodies are *tota quantitativa*, and all parts are *tota quantitativa* in several respects; because as soon as a part is divided from the whole, it becomes an whole; a part, or piece of paper torn, parted, or divided from a whole Sheet, is as much an whole Paper, as the whole Sheet it was torn or divided from. Here you may behold the Vanity of Philosophy, not only in this instance, but in a thousand others. Here I seem to make a contradiction true, *viz.* an whole to be parts, and parts to be so many whole's. Corporeal Motion, *factio*, Action, Division, Separation, Conjunction, and a thousand others such like expressions are various words, or sounds, but all the same in Sense, except some little Modification the Intellect affects, or dresses them with, *viz.* to move corporeally is to thrust one Body out of its place, into the place of another; to act corporeally, is to move one Body into the place of another; to divide is the like, *Ex. Gr.*
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You do write, that's an action; here you move the Inck into so much place or Surface of the Paper, as was possessed by the Body of the Luminous air, which for so much is thrust out of its place. You divide, that is, you move a *totum* into several parts, which are then become *totas*; so that Division here is Multiplication, though opposite, yet equally true. Solomon might very well cry out, *omnia Vanitas*! 3dly, In reference to rest, figure, and position of particles, there is also a continuity. 4thly, All Essences immaterial (*Deo excepto*) and material are *relative*, and *secundum quid*, continuous, quantitative, extensive, and divisible by and through means of a Body, or Bodys. The Rational Soul is quantitative not *in se, ex se*, nor *simpliciter*, but *relative*; in reference to humane Body; for she is extended into *longitudinem, latitudinem, & profunditatem*, by and through means of the said Body; her first and primary Property, and all her second, third, &c. Secondary and Derivative Properties are continued, limited, measured and divided by the Body and its parts, and beyond the Body she is nothing *pro tanto*; and thence it is, that Philosophers say *anima rationalis est tota in toto*; but then to assert, she is *tota in qualibet parte*, is so uncouth, improper, and full of Vanity beyond all expression; bycause it implies, that my Fingers ends and Toes must be Rational, and Sensible; for I hope they will not pretend to separate its Rationality, being her first and chiefest Property from her. To answer, that the rational Soul is not rational in my Fingers, or Toes; bycause she wants adapted Organs, is a contradiction, equal to saying the Rational Soul is in my Fingers, and not in my fingers: But to speak plain Truth, all Philosophy and every part of it as full of contradictions; (except only that part of *Metaphysicks*, that instructs us, there is a true God, and there are immaterial Beings) so that
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it's as easily to be proved, that Light at Noon Day is (i.e. turn'd) Darknes at Midnight, as that Darknes at Midnight is Light at noon Day, which scarce any rational can, or will deny. I say then, that if the rational Souls are quantitative, extended, continued measured and divided by Bodies, so may Angels and Divels in the same Sense of relation be termed quantitative, extensive, &c. And farther those said immaterial Beings are extended, continued, measured (which Divines term defined, or circumscribed) by immaterial places, without the least repugnancy, or contradiction.

61. The reason then why *Peripatetics* are constrain'd to say, that *Anima est tota in toto & tota in qualibet parte*, is to avoid a contradiction; because they assert, that all Essences are indivisible, and therefore the Soul of Man would be render'd such if she were not *tota in qualibet parte*. *Admissio uno absurdo admittuntur mille*; and a thousand more absurdities do follow that Saying. Wherefore they must necessarily allow immaterial Essences to be divisible by Bodies, and only in their Properties, they supposing (which I do not) that Essence is a *substratum* to its first and Secondary Properties; but what that *Substratum* is, they could never tell me, nor I ever understand them. *O curas hominum, O quantum est in rebus inane!* Notwithstanding all those Vanities of Words above mentioned, viz. Quantity, Extention, Continuity, though various in Sounds, yet they seem not much to differ in Sense; wherefore I say those Words are so many various dresses, or modes the understanding puts things into, whereby it is moved into various useful notions, in the same manner as Limners do aspect their Pictures from various Lights, viz. sometimes from one side of the room, and sometimes from another, which makes a Picture appear various, and they make use of that appearance, that serves most for their purpose.

62. Contiguity is a mode or dress the Understanding doth put two or more Bodies into, in relation to their nearness or distance to or from each other; wherefore those Bodies are said to be contiguous to each other, that have the greatest nearness to, or least distance from one another, which distance is caused by, or is a property of Divisibility; for where a Body is not divided, it must be continuous, and consequently there can be no distance; bycause, 1. A continuity is only proper to a single Body; but a contiguity to two at least, or more. 2dly. Bycause a Body cannot be divided unless into two or more. 3dly, You must observe, That neither contiguity, nor divisibility hath any manner of respect to continuity, neither is either of 'em contrary to it; for divide a Body into never so many contiguities, you cannot take away continuity by it. 4thly, The opposite to contiguity, is a greater or lesser distance.

63. Contraries do not destroy absolutely, *etiam in*, annihilate one another. Therefore that contraries do destroy each other *simpliciter* & absolute is an erroneous maxime. Consequently Water doth not destroy Fire *per se*, but *secundum quid*; nor Fire Water. Water doth extinguish the *actus* in Fire burning, flaming and giving light, but it doth not destroy the *potentia*; bycause the same Fire, that was actually burning and extinguishd, may be soon after kindled again; besides Fire may be extinguishd by throwing an heap of dry Ashes or Sand upon it, and so may a burning Candle be blown out with the Wind: But no body will tell you that Ashes, Sand or Wind are contrary to Fire. Moreover one thing can have but one diametrical contrary; Fire doth not destroy Water, but only disperseth it into Vapours, which having a power of being condensed or gathered together again, soon return into Water again. The most you can say of contraries is, that they do fall on each

each other, cease, and suspend each others actions, or *actus*. So that motion, as long as this World stands, cannot be destroyed; though it will and must be gradually diminish'd, and at last be annihilated at the Consummation thereof, but they may cause each other to cease and be suspended in their *actus*. In short the meaning is; contrary Bodies do cause the *actus* of each other utterly that is intirely to cease; and in relation to the *Potentia* of the *actus* in each other their Bodies, it is said the *Actus* is only suspended or interrupted.

99. *To quantity nothing immaterial or material is or can be contrary.* By contrariety here is meant a privation and annihilation or a tendency to it. Immaterial is not contrary to corporeal or quantitative; bycause they can be, have been, and daily are united to each other, in the instance of the rational and immaterial Soul being united to an humane Body. An Angel has been united to an humane Body, a Divil has been joined to a Swine's Body; or any other Body of a different Species. An Angel cannot be united to a living Man, nor a Divil to a living Swine, or any other living Body; bycause two forms (*forme*) cannot inform one and the same Body at the same time; for two forms must make two distinct compound Bodies, so that if the Divil was United to the sensitive Soul of a Swine's Body, the same Swine must be a Divil and a Swine, which is repugnant. Wherefore the entring of the Divels into the Bodies of the Herd of Swine (mentioned in the latter Testament) is no otherwise to be understood, than that accidentally entring their Bodies without being essentially united to them, they moved them forward to run into the Sea; as a small Viper or Lizard, may be supposed to enter thro' a Man's Throat and Gullet into his Body, lying in Sleep on the Grass with his Mouth open, whereby he is moved into Convulsions, and other sort of violent

lent motions. Thus several in their Sleep on the Grass, and in their Bed lying with their Mouth open, have admitted some sort of little Animals into their Stomach, who by their vellicating of the Stomachic Nerves, have been at various Intervals forced into frightful Vomiting of strange Formations, violent Convulsions, and strange intortions of their Bodies, motions of their Tongues into accidental Speeches of Words of various Languages, and thence have been proclaimed to be bewicht by Witches, or Wizards; or the entrance of some Divel, which by length of time have been thought to be removed by Exorcisms of ignorant Priests, though they were removed no sooner, than those little Animals or Insects, which they received in at their Mouth; or Nostrils, have dyed in their Bellies; and this is all the Papiests make such sputter about, of their miracles of casting out Divels by their *Massebook*. These sorts of pretended Fascinations either of Men or Beasts, do most commonly happen in warm Countries, inhabited mostly by Papiests, where *Tarantula's*, and long *multi-pedal* Worms, are very frequent, which wanting no Air, may live a great while in the Body, even some sort of Reptils as Worms of a strange nature and figure may be, and have been bred in a Man's Body, which have caused the same sort of pretended Witchcraft.

100. One quantity may divide another quantity into lesser, or may be made bigger by uniting another quantity to it, as one Spoonful of Water is augmented by uniting, or pouring another Spoonful of Water to it; which I say may make a quantity *major* or *minor*, but not a *magis* quantity, or *minus*, which would in some manner imply a contradiction.

101. In the *Elementata* and all *minus composita*, & *similaria corpora*, viz. Earth, Water, *Aether*,
H Air,

Air, and Fire, their *potentia* of Rest can never be destroyed *privative*, or annihilated, but their *actus* may be suspended, or interrupted, and be caused utterly, that is, intirely to cease. But their *potentia* of motion, that is, mobility being violent must and will be destroyed, or annihilated, when and as soon as the *actus* of motion doth cease. Wherefore as soon as the motion of the *Aether* (which is the *primum movens naturale*) is annihilated, all those *minus composita*, and similar Bodies, as also all *magis composita* and mixt dissimilar and organical Bodies must necessarily return to a *Chaos*, which can never be annihilated; not by *Potentia Divina*; bycause God hath decreed a Resurrection not only of humane Bodies; but probably also of all Bodies as they were in the Garden of *Eden*, but that I refer to the decision of Reverend Divines. Now God's decree being immutable, it would be an imperfection, not to be imagined, should he alter it, and therefore I said, not by *Potentia Divina*. If all humane Bodies must necessarily have a Resurrection, it cannot be denied to the Body of *Christ*, which must also have had a Resurrection as he was Man, and consequently his Body must after the Resurrection be perpetual, that is, infinite, and thence it may be inferred, that *Christ* may possibly Sear himself as he is Man, in his glorious Throne of his Terrestrial Paradise, when formed again, which must be the Garden of *Eden*, and there Reign a Thousand or thousands of Years; by Thousand or thousands may be meant to all perpetuity. But all this with the probable reasons thereof, will be more amply discoursed in another Paragraph, and offer'd to the Opinion of the Learned in Theology.

102. The *Potentia* of motion in all *magis mixta & composita, dissimilaria & organica corpora* is we see every minute destroyed, which in *animatis materialibus* is Death, and in *inanimatis* is called *Corruptio*,

Corruptio, that is to say, the Death of an Animal is a Destruction of its Sensitive mobility; the Death of a Man's Body is also the Destruction of its Sensitive mobility. i. e. of the *Potentia* of Sensation, which is performed by impression, that is, motion. The same rule holds in all the parts of an organical Body. e. g. the *Potentia* of seeing being destroyed, Sight is for ever lost; though the *actus* of seeing may be suspended in Sleep, or by several Diseases of the Eyes, the Sight is not therefore lost.

103. All mixt or compound Bodies are corruptible, and must all be inevitably corrupted; by cause it's by motion they were mixt or compounded, which being in its self violent, and consequently not lasting, must be annihilated; when all Bodies are annihilated in their motion, they must return to Rest, being prior to it in the *Chaos*, and consequently all Bodies must return into the *Chaos* again; but as soon as that happens, there will then be the general Resurrection, the time whereof cannot be known to any created immaterial Being, but to God alone, who doth only know, how long the force of that first impression of motion he made upon the *Chaos*, in forming the World, will last, and when it will terminate.

104. To all immaterial created Beings motion is natural, but Rest is not; by cause God created them to be perpetually and actually moving; not moveable; for that implies a previous Rest. So that immaterial created Beings are from the Instant of their creation moving, and must be perpetually, or infinitely actually moving, without the least necessity of creating in them a *potentia* of moving; by cause they were created moving at the beginning, and consequently must move on perpetually, in regard that actual motion is natural to them, that is, is originally and primarily impressed on them by God, who is Na-

tura Naturans, and the said actual motion is in them, to be called *Naturata*, in opposition to *Natura Naturans*, whereby oft is meant the Creator, though most improperly; bycause he can in no wise be called *Natura* the abstract of the concrete *natus*; for the Creator cannot be said to be *Natus*. Neither is there any necessity of Rest in them; bycause Rest in corporeal Beings is by nature intended to render them durable; for was motion in them not suspended either by partially retarding it, or sometimes by totally suppressing it by rest, they could not continue in their Being so long as nature design'd 'em to continue; whence springs forth this commonly experienced, *Hexameter*, *Quod caret alterna requie durabile non est*; and an other received Maxim, *Nullum violentum est perpetuum*; wherefore the motion of the *Aether*, and of all other Bodies moved derivatively by the *Aether* cannot be *Æternal*, much less perpetual, but are finite and must have an end. Probably here may be objected, that in actual motion there is, and must be a *potentia* in the continuation of actual motion; bycause a Body, that actually is in motion at this instant, must necessarily have a *potentia* of moving the next instant, and the next to that again, and so on. I answer, this is no *potentia*; bycause a *potentia* of motion doth require a division of motion, or intermixture of rest, but in a continued motion, there is no division or intermixture of rest.

105. The import of the next but one preceding Para. is oft pester'd with many dubious Queries of impious Fools, 1. Whether the World was created to continue to all perpetuity, had Man not fallen from his Obedience? 2dly, Whether as Men that lived near the Creation of the World, were very long Lived, Life consisting in motion actuated by the greatest vigo ur of the motion of the *Aether*, so Men living near the end of the World,

World, that is, near its return to second future *Chaos*, must be very short Lived, possibly to Fifteen or 16 Years? 3dly, Whether by the Resurrection of Bodies is meant the individual Resurrection of each humane Body, which seems very unintelligible: Bycause the Body of a dead Man doth and may pass into the Body of another Man that's living; as for instance, a dead Body that is buried under the Earth, is in time all dissolved into the Juice of the Earth, which passeth into the nourishment, accretion, and substance of esculent Plants, these being eaten by Beasts pass into their substance, or are converted into their Bodies, their Bodies are eaten up by living Men, whose substance passeth and is converted into their Bodies; or those said Plants being eaten by Men; are converted into the substance and Body of those Men. Or suppose dead Bodies buried in the Sea, are eaten and converted into the substance or parts of the Bodies of Fish, these again are eaten by, and converted into the parts of living Men; or make the same supposition more immediately of Cannibals; should now those parts of dead Men be taken away from others (into whose parts they are converted) to reconstitute the Bodies of those first Men, then these latter must want parts to constitute their Bodies. Wherefore it seems more likely, that every Soul at the Resurrection shall have a new Body formed again out of the *Chaos* like unto his former; and what concerns the expressions of Holy Writ, that seem to contradict this opinion, they may be conceived to be tropical or figurative. Whether a Soul expired out of a very old decrepid Body, shall at the Resurrection be re-united to a Body of the same deformed Age, or to a Body in its full Vigour and Youth? And 4thly, in regard that Bodies after the Resurrection must be contained in a material place, whether shall the *Chaos* be formed again into a

new Garden of *Eden*, adorned with beautiful Creatures as Animals, and contain the whole number of pious Men, who shall be so risen again, and there live with *Christ* in the Body, to reign over them to all infinity; or shall those pious Men live in an immaterial Heaven, or a material one, as the *Æther* is said to be? I cannot see but material Bodies may as well be contained in immaterial places, as immaterial Beings are contained in material places, viz. the Souls of Men in humane Bodies; however it is more consonant and safe for Men to desist prying or inquiring into the Decree, and sacred Council and Determination of the Almighty, than impiously or foolishly to offer at such sort of Questions, or any other such like relating to the *Trinity*, or *Binity*, I mean the Unity of God the Son with the humane Body.

106. *Nothing doth, or can move it self, but every thing is moved by another, or at least (if not sometimes by another extraneous Body) by another heterogenous Body, that adheres to it, or by crowding into its Body through forcing into its pores, or making Pores into it, doth as it were so unite to it, as causeth it to appear, as if it were one Body, though it is no part of it. The Air within the Pores of a sponge moves it, by dilating its Pores, and doth the same to all other Bodies, to which it only adheres, by being admitted within their pores, and is notwithstanding no part of those Bodies.*

107. *In omni genere oportet, ut sit quiddam primum; that is, among all things of one kind or Gender, there must be some one thing, that is the first; as in Bodies an Universal, Quantitative Being, or Body, which is the Chaos. Among moveables the Æther (or Sky Air) is the primum mobile, in respect of the primus motor or primus movens, which is the Creator; but in respect of all*

other

other Bodies, the *Æther* is the *Primus Elater* or Propulsor of all Bodies.

108. Without granting this position, there must be an *Infinitem* in motion in this foregoing Theorem; for should you say, this Body is moved by another, and this other by another, and so on, you must unavoidably fall into an *infinitem corporeum*, and therefore you cannot fetch the cause of motion farther than the *Æther*.

109. Nothing can act or move or be moved corporeally, unless resisted by a proportionable opposition. A Saw cannot sensibly saw Air, or Water, it may any other Body, less hard than it self, that doth resist it. The *Æther* could not move the Air, unless resisted by it, neither could the *Æther* be moved, unless resisted by the Air, Water and Earth, being contiguous one to another. Wherefore if you should suppose a Man to be in a *vacuum*, it would be impossible for him to stir Hand, or Foot.

110. Nothing can properly be said to be heavy, or light in it self, they being only Words, that are imposed by Men to express light things to move upwards from the Center of the Earth, towards the region of the Air and *Æther*, and heavy Bodies to move towards the Center of the Earth, to which it's vulgarly conceived, they have a natural inclination or tendency, that is to say, they move themselves by their own Bodies, all which is evidently proved to be very improbable by this experiment. Take a hollow Pipe or Tube of a convenient length (be it a Reed, or made of Tin, Brass, or any other matter) being left open with an hole at each end; plunge the lower end into a Bucket of Water, almost as deep as it may within a small matter reach the upper hole, which being stopt with your Finger, and the hollow Pipe drawn out of the Water, that Water that is contained within the Pipe, will not

flow out, tho' the hole of the Pipe next the Earth be open, which had it any natural tendency, inclination, or motion of it self, by reason of its supposed Gravity towards the Center of the Earth, the Water would run out, as soon as the Pipe was taken out of the Bucket, which it doth not; but as soon as your Finger is removed to let in the Air, being rarefied through the accession of the Air, that was forced out by the Water upon its admission into the hollow Pipe, the Water comes out forcibly, being expelled by the force of the rarefied Air, rushing into the Pipe.

111. On the other hand, is it likely, that a Feather in the Air climbing upwards, moves by its own inclination of Levity, or is it not the Air, that forceth it upwards?

112. Should a Millstone be supposed to be placed in the Firmament, it would be moved neither upwards nor downwards, but circularly by the vast force, that so great an extent hath, that reaches from the Surface of the *Atmosphere* to the Firmament, and as far again beyond it, as it is from the *Atmosphere* to the Firmament. But should the Millstone be placed in the Region of the Moon, it would be moved downwards by the greater force which the extent of *Aether* (or Sky Air) must have, being larger thence beyond the Firmament, than it is from the Moon to the *Atmosphere*.

113. I do know, that Philosophers make a difference between *Aether* and *Aer*, which is only accidental, the former being thinner and purer, whereas the latter is more rarefied with Exhalations from the Earth, and vapours from the Water, and therefore called the *Atmosphere*, which notwithstanding makes no essential difference, but that both may be called Air in a large acceptation, so that Air is changeable into *Aether* and *Aether* into Air. A Sponge that is pressed together,
and

and a Sponge that is extended and rarefied by the Air, the one is no more to be called a Sponge than the other, the same is of *Æther* and Air.

114. Though no Body can be said to be heavy or light in it self, from moving it self either towards, or from the Center of the Earth; bycause no Body can move it self, yet as to us, we may and do (as I observed before in another Theorem) term, that Body heavy, that is moved towards the Earth; and light, that is moved from it, by an External mediate or immediate moving cause, which is Air, or *Æther*; so that a Body, that is continuous, compact dense, or solid, having fewer, lesser, and more oblique pores, closer and angular Filaments, may be called heavy, bycause the Air being resisted by paucity, straightness, and obliqueness, of its pores, and tortuous contexture of Filaments, which it cannot so readily enter and pass through, moves it more potently and speedily downwards toward the Earth. Whereas a Body suppose a Feather, being pervious with numerous large Pores, and interstices, makes no resistance to the Air, which passing freely through it, doth not move it downwards, and therefore is called Light. Now take the same Feather and rowl it close up into a bundle, so as the Air cannot so readily penetrate through it, by the resistance it makes, it is then moved by the Air downwards, and is termed in some proportion heavy; so that Weight and Lightness are only Affections, and accidental to Bodies, and therefore the same Body may be termed heavy and light; wherefore were they essential to Bodies, and they heavy and light in themselves, the same heavy Body must always continue heavy, and a light Body light. It may be reasonably ask'd, how and by what means doth the Air move Bodies; and why doth it move heavy Bodies downwards, and light Bodies upwards? To the first Question

is answered, a heavy Body (suppose a Stone) where ever it is, presses so much Air out of its place, as its dimensions do possess, and consequently rarefies the ambient Air (by the accession of that Air that's pressed out of its place by the Stone) which moves the Stone to recover its place which it was possessed of before; but of this more will be discoursed, and answer made to the Second Question below in another Paragraph.

115. *All Bodies are more or less pervious with pores, or else they would be perpetual, by excluding the admission of Air, which in time doth destroy all things, by its widening and tearing their Pores in sunder.*

116. *All local motion be it alteration or other, or local motion strictly so called, is caused by rarefaction, and the restraint of it by condensation, which (to me) is nothing but the reduction of a Body, that was rarefied in its particles to its natural state, and position of particles, which it had before it was rarefied, By Rarefaction I do understand an adventitious accession or addition to a Body, either of homogeneous particles, or apposition of heterogeneous, as it happens in a Sponge, that is rarefied by Air, or Water, in its interstices and pores, which causeth an adventitious augmentation or increase of the dimensions of the Sponge, and is condensed by the compressing of the Sponge, and propelling the Air or Water out of it: So that in Rarefaction, as it is described before, there is no penetration of Bodies, nor can there be supposed to be any vacuum; wherefore in a compressed Sponge, the place of the Air that rarefies or enters into the pores of the Sponge, is immediately filled up again by the next contiguous Air, and that by the next again, and so on until all the particles of the Air are reduced again to their former positions. Now, you are not to apprehend, that this successive thrusting*

ing or moving the parts of the Air out of their places, must reach as far as the Center of the Earth, and the utmost extremity of the *Æther*; to make way for each other, until the motion is rebounded again by the Center of the Earth, and the extremity of the *Æther*; but you are to conceive, that the length or distance of this successive propulsion is only to a certain circumferential extent, proportionable to the force, violence, swiftness, and continuation of the motion, whereby the first portion of Air or Airy particles is put out of its first place; for instance. The Propulsion of the Air occasioned by the flying out of Bottled Ale, is not by far to so great a distance, as that which is caused by the discharge of a Gun, and therefore the agitated particles of the Air in the former instance being not so great, or extensive, are sooner and easier returned into their former places, though in the latter it is much longer.

117. The *Elastic* motion of the Air is occasioned by the swift jirk or *impetus* of motion, swiftly propelling the Air out of its place, and consequently as swiftly returning again, which makes it seem to us, as if the Air did return by a Spring. The same *Elastic* motion is also caused, when the Air is propelled to a great distance by a long continued motion, or by rebounding and recoiling, as you will read hereafter. If you pretend to explain the *Elastic* motion by peripatetic principles, I doubt you will be forced into a *vacuum*. The next particular to be explained is, why, and how it happens, that the Air being put out of its place in the *Atmosphere*, the motion thereof is not propagated, as far as the extremity of the *Æther*, in regard there is no manner of interstice or *vacuum* between the *Atmosphere* and the *Æther*. The reason and manner is obvious. The Air is render'd contiguous in its particles, by being divided

ded into multiplicities by exhalations and vapors; now, where particles are contiguous, they easily give way one to another, when moved out of their places, as appears in moving a part of a heap of Sand or Mustard Seeds, these yield to one another to that distance, or circumference, as the proportion of the extrinſick motion doth extend to, the other Sands or Seeds beyond the ſoreſaid circumference being at reſt; but where a continuous Body is moved, as ſuppoſe a Tree (being continuous) of a Mile long, is, if you move the Tree at its beginning, you muſt neceſſarily move it to the Miles end. The *Aether* on the other hand, is in a great meaſure continuous, ſo that if you did ſuppoſe a great Gun diſcharged into it, it would move all the Stars out of their places, were they ten times farther than they are. And the *Aether* as continuous as it is, is eaſily pierced through by theſe propelled *Aethereal* flaming particles or Rayes of the Sun and other Stars, but theſe only paſſing through the parts of the *Aether*, become in a great meaſure continuous again. It is theſe moſt forcible flaming *Aethereal* particles, that obtain the greateſt force of moving all ſublunary Bodies, upon which alſo the Generation, auſtion and preſervation of all Vegetables, Animals, and Minerals do depend, whence is alſo derived that notable ſaying, *Sol & homo generant hominem.*

118. I affirm'd above, there can be no *vacuum* in a Body or Quantity, the reaſon is; bycauſe Quantity is a continuous or continent (*quia continet longit. lat. & prof.*) Extent into Longitude, Latitude and Profundity, filling up a place, wherein it is Seated, or whereby it is circumscribed; now its impoſſible, for another Body to penetrate that Body, without cauſing a larger place; bycauſe the place was filled before, and then it is not a penetration, but an augmentation or addition
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on of one Body to another, with the addition of another place, neither can that very well be, without destroying the continuity of the first Body. Besides, there can be no *vacuum*, bycause that must suppose a contiguity in Quantity, between which a *vacuum* is to be imaginarily inserted, which there is not in Quantity, bycause you must suppose a continuity, before you can imagine a contiguity; for a Body must be continuous, before it can be said to be divisible into contiguity, or else quantity must be created actually divided, which it was not; so that the *Chaos* being the first and original quantity, must have been a continuous solid Body. Wherefore continuity is a property preceding to divisibility, which for that reason cannot be the first property of quantity (as all will have it) but a third (mobility being the second as you will read hereafter) and scarce that, but an affection of it, which only our minds do affect it with, and consequently is only accidental to it, or a meer potential accident, whereas continuity is essential to it, and a quantity cannot be quantity without continuity.

119. If quantity be divisible, it must of necessity destroy the notion of *Atoms*, signifying the least indivisible Bodies, and consequently the World cannot be created out of *Atoms*. But there are most certainly *Atoms*; bycause as there is a determinate biggest quantity in nature, which is the Universe (or else there may be a thousand Worlds) there must also be the least quantity in nature, or else you must grant an *infinitum reale*. That there are determinate quantities is evident in all Animals, that grow to a determinate quantity; now if the parts be determinate, the whole must. The Shaming of *infinitum* by *indefinitum* is a meer Mathematical evasion, as you will read elsewhere; for your affecting in your Brain a real *Atom* with a divisibility *ad infinitum*, conceiving that
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what is called a corporeal *Atom*, you can in your mind divide one into two, and each of those two into two again, and so *ad infinitum* (to avoid which absurdity, that will ruin both Philosophies, you are forced to term indefinitely divisible) doth not render it divisible in *re* or *natura*.

120. But with all the peripatetic and mathematical subtleties you cannot destroy an *Atom*, not so much as mentally; for if you pretend in your thought to divide one real *Atom* into two; those are but two ones, and if into a hundred, these are an hundred ones, so that you can never in your mind, get rid of one *Atom*. Besides you cannot divide one into two in an another Sense; for if it was one and is one, how can you make one to be two; you may in your mind destroy one into a Cypher or nothing, but in *re* you cannot.

121. If then you are constrained to allow of *Atoms*, what becomes of Quantity, which both Philosophies hold essentially divisible into parts, and unless divisible, it is no quantity?

122. Either you must allow divisibility not to be essential to quantity (as most certainly it is not) or else you must deny an *Atom* to be quantity, though it hath Longitude, Latitude and profundity, into which it is extended. But by saying an *Atom* is continuous, as *realiter* it is (for there is no continuity or divisibility of parts in it) you avoid all the contradictions.

123 That there are actually corporeal and natural *Atoms* its plainly proved out of the Writings of *Cartesius* his followers; for in stating *Particule subtilissime*, they do allow actual real *Atoms*; for if they are *Subtilissime*, they must be indivisible, bycause if they can be made more subtil by divisibility, then they are not *Subtilissime*, but *Subtiliores*. Therefore *particule Subtilissime*. (Beyond which you cannot go, or divide, even not in your thought) must be actual real *Atoms*.
Now

Now if *particule crasse* are converted into *Globular*, and these into *subtilissime*, as the *Cartesians* do affirm, then the World must be made out of *Atoms*; for all Bodies are made out of that or those, whereinto they can be dissolved (*principium est, ex quo aliquid primo fit, & in id ultimo resolvitur*) but all Bodies are at least dissolved or dissolvable into *particule subtilissime*, or *Atoms*; for you can go no farther than indivisibilities; so that the World must be made out of *Atoms*. Thence follows, as I said before, divisibility and mensurability are not *de essentia quantitatis*, but only external Affections the mind doth affect them with, that is to say, they are meerly accidental or accidents. To proceed farther, what figure will a *Cartesian* allot to a *particula subtilissima* or *tenuissima*? it being a Body, it must have a Figure, and motion too by their principles; it cannot be angular, or circular, bycause by the Geometrical Elements they are all divisible; now a divisible figure cannot *competere* to an indivisible body, as a *particula subtilissima*; what sort of motion can they grant to a thing, that hath no Figure? None. Then the Universal motion of Bodies cannot be ascribed to those *particule subtilissime*. If one particle hath no figure or motion, all together in a whole cluster can have none, *totum sequitur naturam partium*.

241. It must be confessed, that *Cartesius* himself hath in some sort evaded the force of the above mentioned argument against *particule subtilissime*, which he only calls *materia primi Elementi*, or *minutia indefinite divisibiles*, which word *indefinite* is a meer subterfuge, and never used in any Philosophy in that Sense before him; for a Body must in *re* either be infinite or finite. It cannot be infinite, for Reasons already given, and to be given hereafter; then it must follow, all things are finite in *re*. But to say, a thing is indefinitely
divi-

divisible, is to say, you cannot define, how far it is divisible, which is nothing to the thing it self, but a meer *ens rationis*, or *chimera*. As suppose, there are a great number of Mice in a Room, you will say, there are an *indefinite* number of em; this doth not contradict, but that there are a *finite* number of them in *re*, as thirty, or forty; or if you say, there is an *infinite* number of Men in such an Army, which you know cannot be, but afterwards you explain your self, that by *infinite* you meant *indefinite*, that is, there are so many, that you cannot define their number, though the Muster roll's can to a Man, that they consist of a certain *finite* real number; so that the *indefinite* in your Brain doth not take away the *finite* number in the thing. Wherefore my foresaid objection doth equally hold good against *minutia indefinite divisibiles*, and *particula subtilissima*. If you remove the word *indefinite*, you shake the Fabrick. Lastly, Your Saying that God is *indefinite* in his Power, Wisdom, &c. is not equal to Saying he is *infinite* in Power, &c. I do contradict, bycause *indefinite* and *infinite* must be all one, both in your mind, and in *re*, and no manner of difference between them; for you can as little define what an *Infinite* is, as what an *indefinite* is, therefore they must be all one.

125. In *Cartesius* his Supposition (which is scarce *supponenda*) of quantity of an *indefinite* extention, he doth allow it divided at first into particles of all manner of Figures, except Spherical; bycause if he should have supposed these, there must have been a *vacuum* between four *globuli*, when diametrically placed one against the other; but there being as yet no subtil particles ready grinded, to fill up the interstices between the four *globuli*, he could not; though he tells you, afterwards by length of time, there must some of them be grind-

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ded into Rounds, being his *Materia secundi Elementi*, which ought rather to have been called *Materia primi Elementi*; bycause that being first set in motion to grind the Angles off from the other Particles into *Minutiae*, must *realiter* have been the first; but according to his Supposition, the Universal quantity, or *Chaos* being only at first divided into Particles of angular Figures contiguous to one another, it was impossible for 'em ever to be moved to this hour, their Angles wedging and hindring each other from stirring, unless you will likewise suppose the *Primus Motor* gave them a shake, and so disjoyned them; but even so, you cannot but allow a *vacuum* (though impossible) to make room for their Motion. In my Opinion, these incoherences could never have been avoided, unless in his first *Hypothesis* he had supposed, that the Creator had created the Universal quantity actually divided into angular and spherical Figures, and actually in motion; but then he must have destroyed continuity, and divisibility, and consequently quantity it self, and Rest.

126. The farther Explanation of Rarefaction I must refer to some Theorems, that will be inserted hereafter.

127. Hitherto in the foregoing Paragraphs and Theorems has been discoursed for the greater part of Metaphysics, and Physics *conjunctim*, or relatively, for as much as the former had a relative and generical respect to the latter, and the latter a subgenerical to the former; and sometimes *divisim* by themselves, according as from the one an occasion might flow, or be given to treat of the other. In these subsequent Paragraphs will be only discoursed of the Elements, or rather *Elementata*, and their Properties, of the Constitution of sensible compound Bodies, of *Figure*, *Motion*, *Alkali*, and *Acid*, of *Animal Spirits*, &c.

128. All compound sensible, or natural Bodies are made by the constituting, or setting together real and natural Atoms, which (as I have said elsewhere) are terminate, or principiate and finite Bodies God hath divided Quantity, *Chaos*, or the Earth into, and are to continue (*è Dei instituto & Natura lege*, to a great length of time, but probably not to all perpetuity) so as to be indided and indivisible. There are three kinds or degrees of those Atoms, viz. small, less, and the least, which Nature has ordained to be inconvertible into each other. The least Atoms are in sense the same *Des Cartes* calls *particula subtilissima*, that is *minime*, consequently indivisible, or Atoms, because they cannot be divided into less than the least, so that *Nolens Volens*; that great Author must and doth admit of Atoms, though covered under other Words. Can you in your Intellect divide the least natural quantity into a lesser intellectual quantity? You say, you can, for instance, divide the least natural Sand, or Ash (*Cinis*) into two lesser in your Mind, (*ratione*) and each of those two into two others, and so in *infinitum*, or *indefinitum*, which are both one, only *infinitum* relates to a *res*, and *indefinitum* is that which is answering to it in *ratione*, or relates to an *ens rationis*; either your Understanding must know the dimensions of a least real Body, or doth not know it; if you know it, say of what measure or extension a least real Body is; you cannot. To go farther, if you pretend to know a Body, or *Res*, that's existent out of your Intellect, you must have perceived it by your Sight, Feeling, or other external Sense; if you have, tell me of what extension the least real Body is, that ever you saw, or felt? You answer me, it's of the extension of the least Point; then if the least, you cannot divide it into lesser. If you reply, you can *ratione* divide, then I return to the preceding Argument,
either

either you do know the extention of the least Point, or do not know it; neither can you in your Intellect divide the least Sand into two; for if you can, then it was not the least, &c. 2^{dly}, Divisibility implies either an *activa potentia* in the Understanding, or Nature to divide, or a *potentia passiva* of the *Idea* of a being in your Intellect to be divided by your *ratio*, and a *potentia passiva* of a Body, or Bodies to be divided by Nature. Can an *Idea* that has a *potentia passiva* of being divided into the least by your Intellect, that has a *potentia activa* to divide it into the least, be divided into less than the least, or can your *ratio* divide it into less than the least? If not, then there must be real and intellectual Atoms. 3^{dly}. If you can divide a Body into less and less, and so *ad infinitum*, that is, *infinitum*, then the *potentia activa* of divisibility in your *ratio* must be *infinita*, and consequently a God, for he alone only hath a *potentia infinita activa*, of dividing *ad infinitum*; perhaps you make a reply by this *Enthymeme*, viz. You can by your Intellect make an *Idea* of a Body greater and greater *ad infinitum*, and never arrive to the biggest, consequently you can divide into less and less, and never come to the least, both which *potentia*, as being an infinite or indefinite Cause, can produce an indefinite, or infinite Effect, which I do grant; but God alone is such a Cause. 2. You cannot in your Intellect add to the *Idea* of a *Res*, or Body, a greater and greater quantity, than the universe Comprises, which is a bounded quantity. If you say the World is not bounded, but infinite, meaning interminate, then the World is Eternal, which is repugnant; for there cannot be two Eternals, nor two Interminates. But still you urge, you can add to the quantity of the Universe, and make it bigger and bigger in your Thoughts. But this you cannot do, because you do not know the bigness of the Universe.

verse. But suppose I should grant you can do this, here must follow there repugnances. 1. The Soul, or the Intellect, must be equal in perfection to God, who can only make the biggest. 2. The Soul must be an infinite Cause. After all, it doth not follow, because you can add *ad infinitum*, as seems to appear in numbers, which be they never so many, you can always increase by adding the number *One*; but though you can do this by addition, you cannot subtract from, or divide Numbers into fewer than *One*; there you must stop. Perhaps you say, that number *One* you can divide into *Two*; (which is not Division, but Addition) as for instance, you can divide one Apple into two: I answer, not into two Apples, but into two Parts, which is foreign to this Matter.

129. The short and the long of all their Vanity,
 1 d *Lana Caprina* is,

*Est modus in rebus, sunt certi denique fines,
 Quos ultra citraque nequit consistere rectum.*

130. That is, as there are the least terminate real Bodies, so there are the greatest terminate real Bodies; and as the former are called Atoms, or *minima indivisa*, and *indivisibilia*, so the latter are termed *maxima inaddibilia*, or biggest, which can as little be added unto, as the former be divided; bycause Nature which is immutable, hath formed all Bodies to the greatest bigness they are capable of for that end, which she design'd e.g. should Nature ordinarily have framed Mans Body as big as a Church, that bigness wherein it exceeds the common, or ordinary biggest size of a Man would be frustraneous, (but *Natura nihil facit frustra*) bycause that ordinary biggest Size is sufficient to be subservient to the Soul in Ratiocination, Sensation, and Motion, which was Nature's end.

131. Give me leave here to insert this Observation; That the source or rise of most Errors

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is this erroneous Thought, viz. bycause a Man can, and doth conceive Beings in his Thought, or Fancy, therefore there must be such things in Nature that are answerable to that Thought; as for instance, bycause a Man pretends, that by his Thought, he can conceive (which truly he cannot) an Infinite, or an Indefinite, a Divisible, an addible *ad infinitum*, a Mareman, an *Hippocentaurus*, a Gyant of Twelve, or four and twenty Foot, a *Colossus*, a Pigmy of the smallness of a Thumb, &c. therefore he infers there is a real Infinite, a real Divisible, or Addible *ad infinitum*, a Gyant, a Pigmy, &c. The same falshood of Inference happens frequently enough in Metaphysics, Theology, and, indeed, in all other parts of Knowledge, bycause we can and do conceive Matters in our Thoughts that are possible, (which very oft prove impossible and repugnant) therefore we infer they must be actually so, whereby we are very oft, and every minute almost deceived. What a Vanity is here! to think, or believe, that the Decrees, Laws, Actions, Operations, and Effects of Nature, which are most true, certain, immutable, regular, and orderly, must necessarily answer the rambling, roving, variable, dubious, irregular, and disorderly Inferences, Conclusions, Appearances, and other Operations of the Intellect. We shall never arrive to understand Matters truly and certainly, before we do strictly observe, and closely attend the Laws, Decrees, and Operations of Nature, and natural Bodies, and make those the rule, and standard of the Operations of our Mind. Now I return whence I deviated.

132. An Atom is originally an *integrum quantitativum*, not consisting of any parts; afterwards by continuation of violent Motion becomes a *totum*, consisting of Particles that are the least Fibrils. There is a vast difference between an *Integrum*

and a *totum*. A *totum* is what consisteth, or is made out of actual Parts being united, so that the parts must have been before the *totum*, consequently the Parts are the material Cause, and the *totum* is the material Effect. Now I demand, the parts signifying Partitions, or parted lesser Bodies, (from parting, separating, or dividing) what were they parted, or divided from? Or of what Bodies were they parts? Not of any preceding *totum*, because a *totum* being the Effect, or *Causatum* of parts, which (*viz.* parts) being the Cause must precede the *Causatum*. But here you reply, That a Cause (which are the parts) being a relation to the *Causatum*, (which is the *totum*) they constitute one another at the same instant, and not the one before the other, according to these Axioms, *viz.* *Relata sese mutuo ponunt & tollunt; posita causa ponitur effectus*. These Axioms do only respect immediate univocal efficient Causes, not material Causes; and *relata*, that do *sese mutuo ponere & tollere*, properly are only such as are ascribed by the Intellect to univocal Causes, and their immediate univocal Effects, or *Causata*. But I deny, that parts and a *totum* are *Relata*, because there may be many parts of a Body, and yet no *totum*. In all material *tota* the parts must necessarily precede; for instance, pieces or parts of Clay must precede the *totum* of a Brick, those parts of Clay are not to be said to be parts of the Brick, but parts of the Earth from which they were parted or divided. You reply, a *totum* consists only of Potential parts, that is, it may, or can be divided into parts. This is a contradiction, that a *totum actuale* doth consist of Potential parts, or that Potential parts do constitute an actual *totum*; a Potential *totum* I grant they do; besides, *Potentia* is a *meer ens rationis*, and *actus* is *realis*, or is *Synonymus* to *existentia in re*; it is the union of parts is the *ratio* (not *causa*) *formalis* that makes the *totum*. An *Integrum* is what hath no parts

parts, nor consisteth out of parts, because parts are lesser Bodies that are parted or divided from greater; but an *Integrum* was never parted nor divided as long as it continued an *Integrum*; for instance, the *Chaos*, or the Earth mentioned in the 1 Chap. and 1. and 5. of *Genesis* was an *Integrum*, and had no actual parts in it, because it was at first not divided, and therefore it was not a *totum*, for it was not made out of any preceding parts; neither was it a *totum* after it was divided into parts, but those parts after they were parted or divided made *tota's*.

133. In like manner, I say, that Original *Atoms* are *integra*, because they were not made out of Parts, or Particles, but they do consist only of one Particle of the *Chaos*, which one particle cannot constitute a *totum*, though two may. But after all, what became of the definition of *Quantitas, quæ habet partes extra partes*. The *Chaos* was most certainly a *Quantitas*, but as I seem to have plainly proved, the *Chaos* had no *partes extra partes*, neither have Original *Atoms*, nor *Cartesius's particule subtilissime*; here I meet with *Vaniy* again. And Quantity is said to contain, consist of, or be divided into length, breadth, and depth, I desire any *Peripatetic*, or *Cartesian*, to give me an exact definition, or at least a description of length, breadth, or depth, which I could never yet read in any Author to my least satisfaction. Every Plowman can tell you how long, how broad, or how deep a thing is; but it is not every learned Man can describe Length, Breadth, and Depth.

134. If you Mathematically, or rather Metaphysically abstract, and consider length by it self, you will tell me, it's a Line without breadth; breadth is a long surface without depth, and depth is a Line hath a long surface, and what else? Or thus; you divide quantity, that is, magnitude or bigness into three *Species* or *Kinds*, (as for Num-

ber, or Oration, they are not properly a quantity) *viz.* a Line, a Surface, and a Body. The first is long and not broad; the second is long and broad, and not deep; the last is long, broad, and deep. *Physice* a Line is long, broad, and deep; a Surface is broad, long, and deep; a Body is long, broad, and deep; that is, all Lines and Surfaces are Bodies, and all Quantities are Bodies; Length, Breadth, and Depth are only Modifications, Relations, and Habits, the Mind feigns and applies to 'em. What becomes of short, narrow, and shallow? Each Body is as much length as breadth, and as depth and length as it is breadth. All this is meer Banter, Vanity, and Incapacity of the Mind, which knows not how to explain in Words, what she thinks she apprehends.

134. An Atom signifies a real, or corporeal *Indivisum*, which in your Intellect you may term an *indivisible*; of what dimension an Atom is, whether the least, less, or little cannot well be expressed, bycause it implies a Negative, (though in it self it must be a Positive, or else it's nothing) unless you will explain it by another Negative, which is *idem per idem*. An Atom is the least real, or natural Filament.

135. A Figure is the representation or expression of the shape of Quantity, in respect to (or *quatenus*) Strait, or Angular; a Figure is either External, or Internal; the former is of the superficial Parts or Particles of Bodies; the latter is of the internal Parts or Particles.

136. The Figure of an Atom is a *Strait*, (*rectum*) and not a *Round*, as commonly most have conceived it, and has proved the cause of many Errors. The mistake ariseth hence, bycause most do conceive an Atom to be a Point, *Punctum*, or Puncture, which to the Eye appears commonly Round; but the least Puncture must be Strait, bycause all Rounds are made out of Straits,

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Straits, and all Straits are the measure of Rounds.

137. A *Strait* is the Principle, or Original of all Figures, consequently all Figures are made out of Straits. Take a *strait Line*, or Stick, and deflect, inflect, or bend it equally, until it's closed, it must come to an equal Round, or Circle; if you equally reflect, or bend it back again, it must return to a *Strait*, which then must be the measure of a Round; therefore all crooked Figures and Lines are made out of *Straits*.

138. All Rounds are either closed, as Circles, or Ovals; or open, as quarter, half Circles, or Ovals, &c. either are simple; as equal Rounds, which are made of equal obtuse Angles, or mixt, that is, consisting partly of obtuse, and partly of acute Angles, either of which may be equally, or inequally obtuse, or acute.

139. A Circle is a closed equally obtuse angled Figure, which must necessarily consist of a Circumference, and a Centre; for if it has a closed equal Circumference, that must have a Middle, which is the Centre, or *κεντρικον punctum* (from *κεντρον pundo*) that is, the middle Point, from which Lines being drawn to the Circumference are all seemingly equal. It follows thence, that in a Circle; be it never so small, there must be a seeming equal distance of place from the Circumference to the Centre, which, if filled with *Strait Semidiameters*, make a Globe, or *Globulus*, according to the great or lesser extension thereof.

140. If all solid Circles, or Rounds, Globes, or *Globuli*, are filled with *strait Lines*, Fibres, or Filaments, from the Peripherie to the Centre, all motion must necessarily be from the Circumference to the Centre in a *strait Line*, bycause its forced to be such by all the *strait Lines* that fill up the whole content of the Globe. That *strait Motion* cannot go beyond the Centre, bycause of the united Resistance which the contiguous *strait Lines*,

Lines, or Fibres make from the opposite side of the Circumference, filling up all the Spaces, so that we need not say, all weighty Bodies naturally tend to the Centre, but they are forced thither, and cannot be impelled farther. This whole premised Matter will be hard to be understood without explaining it by the Example of Figures, which the Bookseller is loath to be charged with; besides, should all what is, or ought to be contained within this Treatise, be explain'd, as it doth require to be well and easily understood, it would exceed a very large Volum; so that it must be left to the adventure of the Reader's Apprehension.

141. It appears then to me evident, That the *Particulæ subtilissimæ*, or least dusly Particles must be *Straits*, and not *Rounds*. 2. As a *Strait* is the *Principium*, (which can be but *one*) so the least compound Figure is an Angle, which being *obtusè*, or *acute*, do constitute the two Elements out of which secundarily all other more compound Figures, *viz.* Circular, Oval, Spiral, Triangular, &c. are formed. 3. All compound Bodies are constituted out of Angular Filaments, that is Filaments that are posited obtusely, or acutely Angular; that is to say, all Particles of Bodies are Filaments, Fibrils, or Capillars.

142. An Angle is the oblique, or transverse meeting or concurs of the *termini* of two Straits.

143. The oblique concurs of the *termini* of two Straits make an obtuse Angle. The transverse meeting of the *termini* of two Straits make an acute Angle. Oblique is the nearer and immediate deflecting, or declining from a Strait. The least deflection from a Strait of the *crura* of an Angle renders the most obtuse (*maxime obtusum*) Angle, which deflection the more and more it is, the less and less (*minus minusque obtusum*) obtuse Angle it makes, until it arrives to a transverse concurs, and then it makes the least acute (*minime acutum*)

acutum) Angle; and the more and more the *crura* incline, or are inflected to each other, the more and more acute Angle they make, until they almost meet, and then they make the acutest Angle. *e. g.* extend a pair of Compasses into a Strait, the least declining, deflecting, or bending them from the Strait, makes the most obtuse Angle, as doth also a strait Twig; and the more and more you bend the Twig, or *crura* of the Compasses, the less and less obtuse you reduce the Angle unto. When they are bent to a thwart or transvers, then they make the least acute Angle; if thence you inflect or bend them in, the more and more you bend them, the more and more acute the Angle grows, until you have bent them in most, and then they constitute the acutest Angle.

144. All compound Bodies are either *Fluid*, or *Consistent*. a *fluid* Body is where Particles, or Filaments do not cohere firmly together, but may by a very small force be divid'd, torn asunder, or separated from one another; wherefore they must necessarily consist of Filaments, that are cohering in most obtuse Angles, which easily let go their hold. A *consistent* Body is, whose Particles or Filaments are more or less firmly cohering by more or less acute Angles, and do not easily let go their hold. Hence follows, that the *Æther*, consisting of most obtuse Angles, is the most fluid Body; next to that the Air, then the Fire, and the least fluid Body is Water.

145. The exterior Region of the Earth, and all Terrestrial Bodies are constituted of acute Angles, and proportionably as those Angles are more or less acute, so Terrestrial Bodies are more or less consistent.

146. *Softness*, and *Hardness*, are Properties, or tactil Qualities arising, *viz.* Intels from Fluidity, and Hardness from Consistency. The former is, what doth little, less, or least, (according to the several

several degrees of Softness) resist the touch or easily yields to its pressure; and the latter is, what doth little or much resist its pressure, and with difficulty, or not at all yield to it; as this latter causes an unpleasant, and sometimes a painful feeling, so the former is as pleasing to the touch.

147. *Smoothness*, and *Roughness*, as they are tactile Qualities, are affections of a Body, whereby the former affects the touch with a grateful equality of its superficial Particles, the latter with an unpleasing inequality; so that Smoothness and Roughness in respect to themselves, are the equality, or inequality of position of the internal, and external, or superficial Particles of a Body.

148. *Rarity* and *Density*, are properties of a Body, denoting a multiplicity, or scarcity of Pores. Hence it is, that the *Aether* is termed the most rare Body in the Universe, next the Air, then Fire; and lastly Water. The Earth is the most dense; and Terrestrial Bodies according to the greater or lesser scarcity of Pores are more or less dense.

149. *Perspicuity*, and *Opakeness* are properties following the former. *Perspicuity* implies an openness of Bodies (either consistent, or more frequently fluid) through Pores, giving passage to luminous or lucid Particles. *Opakeness* denotes closeness in a Body through scarcity of Pores, whereby the passage of luminous, or lucid Particles is in a great measure stoppt up.

150. *Light*, (luminousness) and *Darkness* (*tenebræ*) is where the former finds a free admission through the most porous or more rare Bodies, as the Air and aerial Bodies are; the latter excludes all lucid or luminous Particles, through a total want, or privation of Pores. Thus the Earth or *Chaos* was said to be covered with Darkness, in the 1 of Gen. viz. *And darkness was upon the face the deep*. Here by Deep is meant the Earth, or
Original

Original Quantity; for Deep, as I said elsewhere, comprehends also Longitude and Latitude.

151. *Heat, Coldness, Moistness, and Driness*, are properties, which may be explained either relatively, as they are tactil, or as they are absolute Properties of Bodies, acting upon each other. Likewise all first and secondary Properties may be handled either relatively to the Senses, viz. Light in relation to the Sight. Thunder, Cracking shrill, &c. to the Hearing, Tactils to the Touch, &c. sweet, bitter, acid to the Taste; or as absolute Properties. In explaining the Properties of Bodies we explain their Essences, for we can understand an Essence no farther than its Properties, unless you will suppose an imaginary *Substratum* to these Properties, which none can tell or conceive what it is; (unless it be *Quantity*) wherefore the Essences of all Bodies must be the same, differenced only by various Propertie.

152. In regard the discoursing of those absolute Properties would take up a large Volume, I shall for the present pretermit them, and the nature, or absolute properties of Fire, and only illustrate some few tactil Properties.

153. A Body, or its Particles are said to warm, when by their motion they gently move, stir, or agitate the animal tactil Spirits, and cause a pleasantness in the feeling. When the said motion is stronger, and move, or agitate the tactil Spirits more forcibly, then it's said to cause an heat in the Touch, which is not pleasant; but when the said tactil Spirits are moved, or stirred violently by the violent motion of external Bodies or Particles, then they are said to scorch; and those Spirits being moved most violently, (so as to disperse and destroy 'em) by most violently moving extrinseck Particles, then they are felt to burn.

154. *Coldness* is caused by diminishing, retarding, or putting a stop to the natural motion of
the

the animal Spirits. Thus some Bodies cause a coldness by repelling, beating back, or crowding together the said Spirits. Sharp winds consisting of terrestrial Particles, rarefying, or filling the pores of the Air, and being of acute Angles do unequally repel the Spirits, (which consist of the least Filaments posited in obtuse Angles) and cause a coldness in the feeling; and the repulsion being unequal, occasions that roughness of the ambient Skin, commonly termed the Seat of Feeling.

155. An hard Body by compressing of the Nerves, or crowding the Spirits together, doth also cause a coldness. There are other ways of cooling the Tact, which being too numerous to be recited here, must therefore pretermitt them. All cooling Bodies condense the Skin, and all warming ones rarefie it. Motion causeth Heat; Rest, and retardation of Motion are the causes of Coldness.

156. *Moisture*, or *Wetness*, is a property singular to Water only, which being a fluid smooth Body, (though more gross than the Air) and consisting of grosser Filaments concurring into less obtuse Angles, than those subtiler of the Air, (meeting in Angles that are more obtuse) and therefore more cohering, doth by being overspread the Skin (or seat of the Tact) evenly, and smoothly, and by adhesion to it, occasion what is called Moistness, or Wetting.

157. *Drieness* is caused by Bodies that do amove, wipe off, or disperse the said moistning Water. The Air, as far as it is filled with watery Vapours, is moistning; and Drying, when its loaden with Exhalations that turn into Wind, so that the Air purely of it self, or *per se*, (which is *Aether*) is neither moistning or drying; but *per accidens*, viz: by motion or agitation is drying; and is moistning by the means of Vapors. Neither is Air *per se*, heating or cooling, but by Motion, which

which if violent and quick, is hot; if slow and feeble, is cooling. Air, if violently moved by Winds, is at first cooling, (according to what hath been hinted before) but afterwards becomes heating.

158. Motion follows the Rules and Laws of Figure, wherefore all motion is originally, naturally, and *per se*, strait; but *per accidens*, being resisted by the meeting with other Bodies, whose Figures being either acutely, or obtusely Angular, is by them turn'd off into an acute Angular, or obtuse Angular, and thence oft circular Motion.

159. I must defer my ampler Observations upon Figure, and Motion, as likewise my farther Sentiments of Earth, Water, Air, Æther, Fire, their secondary Properties, Loadstone, Meteors, humane Physiology, Generation of Animals, &c. to another Winter's Lucubrations. Wherefore for the present, I shall only subjoyn a short Discourse of Motion, Animal Spirits, and of *Acid*, and *Alcali*, which Terms being so much in vogue, not only among the Learned, but the very *Plebeians*, who apprehending what *four* or *Acid* means, conceive that by *Alcali* must be meant something, that's diametrically contrary to it, and upon this confused Notion they judge themselves capable enough to pass their Opinions in a balance with the most understanding of Physicians, and even these upon erroneous Conceptions of the import of *Acid* and *Alcali* can scarce agree, what is to be term an *Acid*, or what an *Alcali*. *Acid* and *Alcali* are gustable properties of Bodies, that is, they are Properties that are to be discovered, or distinguished by the Taste; and from what Affections and Effects they affect, or cause upon the Taste, they do judge, they ought to affect other Bodies in the same manner.

160. They

160. They are Terms that were originally imposed by Chymists, consequently absurd, and improper enough; for certainly among the Herds of Men, these are the most impudent, ignorant, arrogant, flatulent, flashy and vainly boasting sort of mankind. They are the Pest of *Germany*, and the Vermin of all *Europe*. They are properly Vagrants, or Vagabonds, exceeding in Impostures, Cheats, Lying, and all manner of Impieties, the Dregs of *Gypsies*. Originally Refiners, Founders, or Melters-down of Metals were call'd Chymists, signifying Founders: But some swelling in Arrogancy beyond their Fellows aspir'd to distinguish themselves from 'em, by adding the Syllable *Al* to Chymist, and would be stiled Alchymists, *Al* making an honourable addition to their vulcanous Drudgery, as *O's* and *Mac's* to Names in *Ireland*, whence it happens, that when these vagrant Fellows intend to put any thing Great, or Mysterious, to a Word, they joyn *Al* to it, as *Alcaest*, *Alcali*, *Alcool*, &c. some of 'em being handed to them by a crew of *Arabian Physicians*. Its now come to that pass, that every little distiller of *Aqua vite*, or of Spirits of *Hartshorn*, or *Aqua fortis*, or a dissolver of *Opium* in Sack or Brandy, or an insignificant operator of *Sal volatile Oleosum*, or of *Crocus metallorum*, &c. Intitles himself to the black Dignity of an Alchymist, or Chymist, who in reality is no other than a common Impostor, a Cheat. and a dangerous Fellow to Merchandise with for those keen base prepared destructive Commodities. But the Abusers, or the Abuse, ough not to take away the right use of an Art, which is the most noble, the most admirable, most useful, estimable, and chiefest part of Pharmacy, when. and where it's possessed and practised by skilful Physicians, exceeding the common Galenical, dull, foul, gross, and dreggish Pharmacy, more than the finest and clearest
of

of Wines doth dirty muddy Ditch Water; and in point of pleasantness, safety and wonderful efficacy, those Galenical blew apron Medicines are as far distant from exalted true chymical Preparations, as a Mouse on the Ground from the top of a Church Steeple. *Kali* is a Weed abounding with a Salt, which being incinerated or burnt to Ashes makes a most potent *Lixivium* or Lye, that has not only an Empyreumatic blunt and nauseous taste, but a Power of breaking, subduing, or destroying by contrariety the *sour* or *Acid* of any fluid or consistent Body, whence commonly all Bodies that have a lixivial Taste (as most things have after calcination or incineration) and like to the lixivial Taste of the said incinerated *Kali*, are named *Alkali's*, both by the Ignorant Chymists, and after them by the Learned Physicians, though these have thought fit to extend the Word *Alkali* to any thing, that has a power of sweetning, that is destroying an *Acid*; wherefore they do not only call Lixivials *Alkali's*, but most testaceous Bodies, as Crabs-eyes and their Claws, Coral, Bezoar Stone, Oyster and Egg-shells, Amber, Spirits of Sal Armoniac, of Harts-horn, Mastich; many sorts of Resins, Mans Skul and Mans Blood, &c. also emplastics, as Starch, Gumarabic, Dragant, *terra lemnia*, *sigillata*, Bole Armen, *Sanguis Draconis*, even Steel it self, though very improperly. Some have been so doubtful as ignorantly enough to controvert, whether Spirit of Wine, Fire it self, all igneous Bodies; and most sorts of Aromatics, were *Acids* or *Alkali's*. Notwithstanding all these uncertainties and wranglings, both the Learned and Ignorant have agreed upon these Theorems. 1. That all Diseases are caused either by an *Acid*, or an *Alkali*. 2dly, That all Diseases that are occasioned by an *Acid*, must be removed or cured by an *Alkali*; and all Diseases that are caused by an *Alkali*, must be cured by an

Acid. Then follows a strong dispute among them, whether this or that Disease be caused by an *Acid*, or by an *Alkali*, and consequently, whether it ought to be cured by this, or that *Alkali*, or *Acid*; and lastly whether this, or that Medicine be an *Acid*, or an *Alkali*. This bawling and noising has made so much splutter, that it has reach'd the Ears of the meanest of Phebeians, whom to draw to their side, one or another Physician produces a score or more of Romantick experiments, proving that he has cured most Diseases by *Acids*; another Physician of the adverse Party offers the Testimony of ten patients cured by *Alcalies*, to one cured by *Acids* by *Acid* Physicians; so that there is nothing but confusion and ignorance of *Acid* and *Alkali*, whilst the poor Patient suffers between Hell and Purgatory, and at last Death under the hands of both *Acid* and *Alkali*. The obscurity of the causes of Diseases, as likewise the difficulty of adapting Medicines, that by their contrariety ought to have a power to abate or extirpate these causes, wherein they found the greatest uncertainty was the chief occasion, that made Physicians so greedily lay hold on those two terms of *Acid* and *Alkali*, as being clearly distinguishable by Taste; and the ignorant vulgar being as capable to judge by their taste as they, did as readily and plainly apprehend all those distinctions, inferences, and conclusions that were to be drawn from *Acid*, and *Alkali*, though as I shall now evidently demonstrate, they have all been most grossly and fatally misled and mistaken.

* Though
properly A-
marum
(bitter) is
a contrarie
to Dulce
(sweet).

161. The contrary of *Acidum* sour, (sup-
pose of Vinegar, Juice of Limons, Spirit of Vi-
triol Salt Marine, Sulphur, &c.) vulgarly * is *Dulce*
sweet like unto Sugar or Honey, if you re-
fer them to the Taste; so that in that sense a
lixivial or alcalious Taste is not the contrary to

an

an *Acid*, or sour Taste, it being as far distant from Sweet, as the said *Acid* or sour. Wherefore this matter is to be understood quite otherwise. *Acidum* in the Sence they intend to render it a contrary to *Alkali*, is not to be derived from *acere* (to be or grow sour,) but from *Acies* signifying an edge or keen sharp Substance, or Body, puncturing, cutting, parting or dividing in sunder with a sharp edge; so that *Acidum* in this latter sence is the same or synonymous with *Acutum* (from *acutere* to sharpen) importing sharp by cutting or dividing in sunder with a sharp edge, or puncturing, and according to this meaning all *Acids* or sour are sharp, cutting, dividing and puncturing, as appears plain enough in the sharp cutting Taste of Vinegar, Spirit of Vitriol, &c. Hence it is, that all four Medicines are by Galenical Physicians called inciding, cutting, and attenuating, as *oxymel*, *syr. citri*, *acetosa*, &c. Now to *Acutum* or sharp and cutting, *Obtusum* or Blunt is the sole diametrical contrary. *Acids* and *Alcalies* are gustable qualities particularly diametrically contray to each other and very uncertain as being determinable, or distinguishable only by one Sense, namely the Taste; whereas *acute* and *obtuse*, or *acute* Angles and *obtuse* Angles are universally diametrically contrary, and distinguishable by all the Senses, viz. The feeling (which is the most certain of any) Sight, Taste, Smell, and Hearing; for you may by your Hearing distinguish a shrill or acute, from an obtuse or blunt sound, all which doth render the judgment of acute and obtuse much more certain than of the other. Moreover you must observe, that the force of *Obtuse* is an Hundred fold stronger than of an *Acute*; for ten Beetles or great Woodden obtuse or blunt Hammers shall in the tenth part of the time Demolish an House, beyond what an Hundred acute sharp Pick-axes, or Axes, can be experienced to do; whence it is, that the *Romans*

were forced to use their huge obtuse Rams to make breaches into their Enemies Walls. A blunt great Ball discharged out of a Cannon against a Wall, has the force of an Hundred acute sharp Pointed Slugs discharged out of the same Cannon; so that it appears plain, that a contunding or bruising obtuse force is incomparatively more potent, than a cutting or puncturing acute force. You may take a thousand Strokes, with the sharpest Axe, at a blunt Marble, whose bluntness shall at the first Stroake turn the acute edge of the Axe, with very little damage to the Marble. An Acute or Edged Body being turn'd into blunt, of it self seldom or never returns to an edge again.

162. The *Æther* is the most obtuse-angled fluid Body in the Universe; next to that the Air, whose great force appears plainly in a Bottle of new Ale, Beer, or Wine, hermetically closed: The least Proportion of Air or Aery Spirits being by fermentation never so little rarefied, has force enough to break the Bottle, were it is as thick as a Church-wall. The like is observed in a Thimbleful or two of Gun-powder, discharged out of a Musquetoen. Fire is the next obtuse angled, fluid, sensible, or natural Body, whose force is sufficiently known to all Men: Next is *Mercury* or *Quick-silver*, whose obtuse force doth in few minutes tear in pieces Gold the toughest of all Bodies, which the acutest Spirit of Salt will not do in several days. Next to Spirit of Salt, the most sour, acid, sharp or acute is Spirit of Nitre, then Spirit of Vitriol, after which Spirit of *Sulphur*, then Juice of Berberies, next Juice of Limons, next Citrons, then Vinegar; but the least sharp or acute is Juice of Oranges.

163. The Animal Spirits (among which the humane are the finest, beyond the Spirits of any other great moving living creature) are a fluid, consisting of the least kind of obtusest angled
contri-

continuous Bodies, and consequently the most forcible, and were they not allayed or Balanced with the acutest angled finest Salts, they would be intirely *Æthereal*, and almost of an equal force. By their fluid continuity the animal Spirits in the Toes, or other extremest part (consequently, in the intermediate parts) are moved almost at the same instant (allowing for rarefaction) the will moves the Original or *principium Spirituum* contained in *principio nervorum*, like unto Water (that's a continuous fluid also) contained in a Syringe (were it a Mile long) is moved at the furthest end of the Syringe almost at the same Instant the pressing Handle moves the Water at the hither end, abating only so much time as the Water may take up in being somewhat rarefied by the compressure. Likewise move a continuous Tree (be it never so long) at one end, at the same instant the other end must be moved. That the *Will* should move any particular Joint, without moving any other, seems as if those continuous filaments or streams of Spirits contained in those minutest *Tubuli* of the Nerves, were moved by her power of moving the Spirits of every particular *Tubulus* separately, like unto an Organist, who by moving any particular Key only, admits the Air forced into that particular Pipe, and no other.

164. This Description of animal Spirits implies the *lymphæ nervorum* to be that fluid continuous Body here spoken of, as the continuous fluid Body of Brandy is called Spirit of Wine. Wherefore it must be an Erroneous Conception of those that conceive the animal Spirits to be contiguous least acute Bodies, floating or moving in the said *lymphæ nervosa*, or floating loose throughout all the sanguis, soft, fleshy, or hard Spermatic Bodies; by which latter Conception its impossible, to give the least shadow of reason or cause of those several operati-

ons and effects of the animal Spirits; whereas by the former all difficulties, Queries, effects and operations, may be plainly solved, answered, and expounded. You may likewise by the former Conception of the Spirits evidently discover the Constitution of the parts of the Body, their actions, and offices of the Bowels, the Diseases of the Parts, and the Remedies. But before I proceed I ought to tell you, that according to the proper Sense and meaning of *Alkali*, which implies only a lixivious Taste, those testaceous Bodies, Gums, and Emplastics above recited, can in no manner be called *Alcalies*, as having no lixivial Taste; but properly and really they are obtuse angled Bodies, or *Blunts*; so that all *Blunts* are not *Alcalies*, tho' all *Alcalies* are *Blunts*. 2dly, Obtuse Bodies do by far both in number and force exceed *Acids*, which in comparison to the others are but few and much less forcible. By obtuse Bodies, I mean compound Sensible Bodies, consisting of many more obtuse angled particles, than acute; for all mixt Bodies are compounded out of both. 3dly, The apprehending of the Notions of this Paragraph rightly, will turn the Body of Physick topside-turvy, and detect abundance of Errors in the Theory and Practice, as it will also make those matters plain and evident that relate to either.

165. Among the various Controversies that arise concerning *Acid* and *Alkali*, I can only here ventilate that vulgar and hitherto undecided wrangling Contest, whether most Diseases be caused by *Acids*, or *Alcalies*. Those that so shamelessly, ignorantly enough, and fatally to Patients, pretend to cure most Diseases by *Acids*, must, according to the common maxime of the Therapeutic part of Physick, *contraria contrariis curantur*, acknowledge most Diseases to be caused by *Alcalies*, Or rather obtuse angled Particles, unto which *A-*
cids

acids, or rather *Acutes*, are contraries. The antecedent causes of most Diseases are the fluid parts of the Body, being the fluid animal *lymph*a, the glandulous *lymph*a, and the Blood being vitiated. Those fluid parts, and particularly the Blood, seem to be analogous to Wine, which growing acid, sharp or acute, is found to be diseased; and when its turn'd so acid or sharp as to become Vinegar, then that Wine is dead, and is converted into a new body, according to the Axiom *Corruptio unius est generatio alterius*, and can never be reduced to Wine again. On the other hand, should you pour Spirits of Wine (which is an obtuse angled fluid body) to Wine, it will flatten it, that is, obtund it, but it will not kill the Wine; tho' if too much be added to it, it may cause a disease, not so dangerous as the other. Now the question is, should Wine become sick and acid, and should you pour another acid to it, as Spirit of Sulphur, Vitriol or Salt, is it not daily experimentally found, that those Acids will and do entirely kill the Wine, and convert it into Vinegar? The same will happen to the Blood, and other fluid parts of the Body, when Diseased or beginning to turn acid, by administering *acid* Remedies. But here is matter of fact objected, *viz.* that in Fevers, Jaundices, Small-Pox, Consumptions, &c. *Acids* have been exhibited, and some Patients have been recovered; but how many have died? that's not to be spoken of, let the Grave cover the dead. True it is, some have recover'd of some slight Diseases after the use of *Acids*, but they would have been reduced to health much sooner without them. Besides, some robust Bodies when diseased, scarce any preposterous Remedies will kill 'em; but time, change and thinness of Diet have restored them; whereas the exhibiting of proper Remedies hath discernably to the eye both mended, and cured Diseases in a short time.

166. You may object, that my naming the fluid Juices, as animal and glandulous *lymphe*, also the blood parts of the body, is erroneous, as being every minute consumed, and new supplied. I answer, take away the fluid Juices from a living Body, and there remains no longer a living Body, but a dead Carcass. As for the daily consuming and renewing of those said fluids, the same happens to the consistent parts, *viz.* Flesh, Nerves, Cartilages, Bones, &c. which are also daily consumed and renewed, and therefore ought no more to be called parts than fluids, consequently here must arise a *totum* without parts.

167. Against the premised Discourse may be objected, that one kind of acid may be, and oft is contrary to another, and consequently may and doth alter, correct, and subdue it, wherefore some Acids may be proper against Diseases, that are caused by different acids. 2dly, Some sorts of *Acids* do preserve the Blood, and all other Juices, not only from putrefying and corrupting; but being partly putrefied do reduce them, in the same manner as smoaking an empty Cask, that's intended for *French White Wine*, doth very much preserve that Wine in its intire mixture and temperament, and not only so, but when Wine begins to pawle, grow flat or turn to the eagre, the admitting a flaming Rag dipt into Brimstone into the Cask through the Bunghole, doth very oft recover that Wine, or at least hinders it from a farther decay, which operation the *Dutch Wine Coopers* call giving the Wine Air, Breath or Vent. In answer to these Objections, you must first consider, what is meant by contrary, *viz.* Any Body that is in any manner resisting or opposing any other Body, the Word *contrarium* being compounded out of *contra* ruer, that is, *ruer* in *aliud*, to fall upon another Body, or to oppose it self and resist against another. In this Sense all mixt Bodies that are not the same,

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but something different each from the other in temperament (and for so far as that difference is, so far they are capable to act each against the other) are contrary to one another; consequently one acid is different from the other, and so is one *Alkali* from another. So that it must follow, that there are a great many degrees of contrariety, the extreamest whereof doth intirely destroy, or annihilate the *temperament* or *crasis*, and mixture of Bodies. 2dly, An *alkali*, or rather an *obtruse angled* body, doth more forcibly, directly, and *e diametro* oppositely Act upon an *Acid*, or *acute angled* body, so as in their extreamest degree, they do destroy and annihilate each others temperament and mixture, which one *Alkali*, or one *Acid* can do to another *Alkali*, or another *Acid*. 3dly, All mixt bodies do consist of some obtused angled particles, united with acute angled particles; whereof some of those mixt bodies approaching through their plurality of obtuse angled particles, nearer to obtuse bodies, are to be termed obtuse bodies, (which others ignorantly call *Alcalious* bodies) some again abounding more with acute angled particles, ought to be Named *Acid*, or *Acute* bodies. 4thly, For the reason forementioned, where a disease is occasioned in such obtuse mixt humane bodies, by declining to acid or acute particles, you are not to obviate these with the highest degree of an obtuse angled (or *Alcalious*) remedy, but a moderate one, suitable to that declination, or else you utterly destroy the Patient. So likewise, where Diseases are caused by the Superdominion of obtruse angled particles, you are to Administer remedies that are answerable in their acidity or acuteness to such a degree, as will reduce the temperament to a just moderation; consequently the greatest mystery of the Therapeutic or Practic part of Physick doth consist in a just application of remedies of a suitable degree, which
you

you must not expect to find in every little Chymist, or other little pretenders to Physick, but in true Physicians. 5thly, As all Wines (to which Physicians generally refer the Blood, whereout the animal Spirits are engendred, to have a great analogy) do very much differ in their mixtures and temperaments, so do the blood and animal Spirits; It's observed, that most soils do produce different Wines, as about *Orleans*, *Towrs*, *Anvers*, &c. Wines are small and acidulous, (that is very tartarous) though notwithstanding the obtuse angled Spiritous particles have the predominance.

168. Those Spirituous Particles being very subtil, would be very apt to evaporate, were it not that the acute or acid and tartarous held them close in, for which reason they are to be kept in cool Cellars, and for a farther preservative they do sometimes smoak the Cask with Brimstone, whereby the acid Spirits of Sulphur, being let into the inside Pores of the Cask, do very much by their acid constrictive faculty assist and corroborate the said native acid particles of the Wine, to retain their Spirits. On the other hand all *passado* Wines (that are pressed out of Grapes somewhat dried in the Sun, as *Canaries*, *Fayalls*, &c. Have not by much so great a proportion of acid particles, being a little bent into obtuse, or rather grown less acute by the Æthereal obtuse rayes of the Sun) containing much fewer acid particles, and consequently less Tartar, will not endure much cold, nor having their Cask Sulphurated, that would destroy their Spirits, though otherwise in them all very strong, and therefore require very thick strong Vessels to contain them. In like manner, there is a difference in the general temperaments of the blood, and animal Spirits of Men (and consequently of their *Genius*, faculties of their Souls and Manners, according to that saying of *Galen*, *Mores animi*

animi sequuntur temperamentum corporis) that inhabit this or that soil, this or that Country, or Climate. There is also besides a particular mixture and temperament of Blood and Spirits in every individual Person, which makes all Men differ in their *Genius*, faculties of their Soul and Bodies, and Manners. In some their blood doth consist of a great proportion of acid or acute particles, whose animal Spirits are very subtil and contained in Vessels that are thin. These Persons are very incapable to walk in the Sun in an hot Summers Day, but are apt to faint, and by reason of the dispersion of their Spirits are oft forced to rest, and very subject to what Physicians call Hypochondriac affection, or *status*, though in their faculties of their mind, some of them are very Ingenious and Understanding, and in their Manners are Courteous and of a gentle Nature enough. Most Women are much of that temper, and consequently very apt to fall into Hypochondriac Vapours upon every little passion, or disorder of dyet, &c. Now should you exhibit to these Patients *obtusé* medicines in an extreme degree, you would most certainly ruin them. To these, acidulous medicines as *Spaw*, *Tunbridge*, or other Chaly-beat waters are oft found very advantageous. Others have a thick fibrous, strong and tenacious Blood, perfused with very potent animal Spirits, floating in close thick Vessels. These are commonly very robust, adapted to all manner of fatigues, and some of them gross enough in their understandings, morose, and sufficiently unmannerly, and when falling into Diseases, which prove oft very hazardous, are not easily recovered. Here you will find some *Acid* remedies to do a great deal of mischief, and obtuse medicines are to be very well moderated.

169. Should I follow the Road, which this spacious Discourse would lead me into, I should scarce come to my Journeys end in many Months, and therefore do content my self in having here inserted some few imperfect instances; I shall only add, that no *Hypothesis* appears to me so easy and plain, whereby to arrive to a very probable Theory of the Physiology, Pathology, and the Practice of the Therapeutic, as the apprehending well the Discourse of *Acute* and *Obtuse*, vulgarly and corruptly termed *Acid* and *Alkali*; but at this time, as useful as it is to me, I do not here pretend to obtrude this Discourse to Men of better Judgment.

170. Before I leave this subject, I will only unravel, what those Ignorant Chymists mean by their *Archeus*, and what Enthusiastic Philosophers pretend by their *anima mundi*, seeming to make an *animal* of the World.

171. Spirit, (*Spiritus a spiro*) seems to denote Originally a breath, or a *status tranquillus*, being the most subtil body Man can frame to himself, consequently invisible, imperceptible by the hearing, &c. So that any thing may be called a Spirit, that is the most subtil in its kind. Wherefore *Cartesius* his *particule subtilissime*, ought to be called Spirits. The most subtil Parts of Wine, or of any other Liquor, are to be Named Spirits, as likewise the most subtil parts of the blood are the animal Spirits, that are perfused throughout all the parts, both fluid and solid, and all the *viscera*, which being the Spring, and performers of all the motions of every part of the body, do prepare, concoct, confect, and distribute all the juices of the body, actuate the senses in their sensations, and all the *viscera* in their Offices, and move all the Joints locally; keep in due order and govern the whole body, and all its parts. In short, the *Animal Spirits* are the head, source, spring,

spring, original, and *prime* director of all the Body. Now *Archeus* is a bombast word made out of ~~æther~~ *principium*, signifying the beginning, original, and chief director of all the chief motions in the body, keeping them in a due harmony; And what can this be but the *Animal Spirits*, which being the most obtuse, subtil, (consequently the most potent, impetuous, agil and swift) and continuous body of the whole humane structure, can be only the *Archeus*?

172. The *Æther* with its conglobated parts, viz. the Stars, by their æthereal particles, spirits, or beams, that are perfused throughout most parts of the universe, causing all motion in all its parts, directing, governing, and preserving all the motions of the universe, and the Parts thereof, in a just order and harmony, is the sole *spiritus* and *anima mundi*.

173. From the 126th paragr. I have transferred the further explication of *Rarefaction* to this, to which, in my opinion, all internal (and very oft external) local motion is to be adscribed, as the first immediate (tho' oft remote) cause, and to which by others all violent and sudden local motions are sometimes imputed, that happen (as some will say) by the impulse of nature, abhorring a *Vacuum*. Internal *Rarefaction* is the distention of a body by widening of its pores, through the accession of an adventitious similar or dissimilar body: And *Condensation* is the contraction of the pores of a body, by the subduction of an adventitious similar or dissimilar body, or its particles; this appears by the crushing of a round solid lump of Clay by the hollow of your hand and fingers; by which in crushing you force the external superficial parts inwards, which must cause a swelling, or increase of magnitude in the parts next adjacent to them, or rather the next inward region to them. This increase in magnitude must require

quire a greater internal place, which cannot be had without breaking the next to that into particles (by widening and tearing its pores in sunder) which particles cannot yield their places to the said increased magnitude without a rebound, or reaction, in forcing themselves through the external superficial increased magnitude, and breaking that into particles ; so here by one crush you do break at once the external superficial region of the ball of Clay, and the interior region that's next to it ; all which shews, that internal motion is by rarefaction, and that rarefaction in this sense is no other than increase in magnitude or extent. A Bladder fill'd with Air, or any other fluid matter or liquid, being condensed or squeezed into a compact body, by expelling the air out of it, and afterwards covered with ashes, sand, or any other small bodies proportionable to be moved by it ; the Bladder upon being filled again with air by your breath, or with any other liquor by a Syringe (that is to say rarefied) moves all the ashes or sand upon and about the bladder locally, that is, from one place to another. In like manner a Sponge condensed by pressure, and cover'd with Feathers, upon the rarefaction of it by the air, entring its pores, the Feathers are moved locally from one place to another. From these instances may be reduced, that rarefaction is no other than a swelling, distention, or augmentation of a Body by the addition, or adhesion of other adventitious Bodies, or particles between the pores of the Body of it. But then you are to understand, that by rarefaction of a Body, the next Body or Bodies to it must be condensed or subtracted from, which at the same instant must be supplied again by another Body, or else you run into a *Vacuum*. Suppose a Stone on the Ground is moved by wind out of its place horizontally or *in plano* against another at some distance, which is also moved out of its place by
by

by the first Stone. The Air being suddenly swelled or rarefied by the accession of Exhalations turn'd into Wind, doth violently thrust the first Stone out of its place, and that the second, partly by tumefying or rarefying the Air, that is between them both, and partly by the continuation of the force of the Windy Air, that impelled the said first Stone.

174. To make it plainer in other words by way of query, the chief part of Physicks depending much upon it. Suppose the Wind in the fore-said instance suddenly ceasing after it had made its first impulse upon the first Stone, what is it, that continues the motion upon the Stone? Its answer'd, The continuation of the rarefaction of the Air; for as much Air as the Stone being moved out of its place, to possess the place of that Air, whereby the Air round about that Stone is swelled or rarefied, so much of that Air being rarefied must necessarily at the same instant recoil, and with an *impetus*, or jirk (which is termed, as I formerly said, the elastic motion or Spring of the Air) move to the place left by the Stone to fill it, and consequently by a second rebound or recoil against the Air it meets there at a little distance from the head of the Stone (that is, a little distance before the Stone) move the Stone forward. All this being harder to be understood by one, than explain'd by another, ought to be express'd by Example, *viz.* The Air rarefied or swelled by Exhalations into Wind thrusts the Stone (*A--C--B--D*) from *A* to *B*. The Air that was thrust out of its place at *B* must of necessity be moved to *A* to fill up the place, where it recoils against the Windy Air it meets with there, that caused the first motion of the Stone at *A*, from which motion by this recoiling of the Air from *B*, the Windy Air must be greatly inforced (for by this addition of motion from the recoil-

recoiling of Air the power of the Wind is become an hundred times stronger, and without this addition (which causes an *Elastic* motion) the most violent Wind would hardly move a Fly. In the same measure doth the Stone being arrived at *B*, rarefy or swell the Air, which is between *B* and *C*, which thrusts (though more feebly and slow) the second Stone at *C* forward to *D*, so at length both the Stones come to rest, when the particles of the disturbed air are returned to their former positions, as I have heretofore shewed, where its also proved, that air thrust out its place doth not instantly return again to the same place *ob fugam vacui*. It may be objected in the foregoing Instance, that the air recoiling against the windy-air should rather break, or stop the force of the windy-air; to which is answer'd, that by stopping of the wind, it causes the Wind to be more rarefied, or swelled by the continual accession of wind, that comes from behind it, which then relaxing doth greatly inforce the recoiling air, and adds to its elastic motion. The same explication serves for illustration of the cause of continuation of motion of a Stone, or any thing else thrown out of the hand, about which there hath been so much contest among Phylosophers, *viz. de causa motus projectorum*; so that I cannot see the necessity to constrain me to receive the assertion of *Carsenius*, that motion never ceaseth, nor is lessened, but as much of motion as is transferred to one body, so much is lost from another, as you will farther read in the next Theorem; now, as I said before, this Maxime being denied, his whole Doctrin of Motion must fall, and with it the chief part of the structure of that Phylosophy.

175. Several Glasses standing in Potters Shops among many others, are apt to be broke of themselves, as they term it, without any sensible external violence, what can be the cause of that,
but

but the Air, crowding more and more by continuance of time into the pores of those Glasses, resisting its free motion, doth by rarefaction widen and tear them in to pieces? The same cause may be assigned to the self crackling noise of Wainscot and Deal Shutters of a Window, hapning in all sorts of Weather, but chistly in Wer. It may well be demanded, what should cause this perpetual motion of the Air, not only sometimes (though by violence) upwards, but naturally and mostly downwards, and sometimes sideways, whereas its vulgarly believed, the Air being light is always moved upwards from the Center of the Earth? It's answered, 1. That Bodies in themselves are neither heavy nor light; for Air were it not rarefied or swell'd up with Clouds and Exhalations would not be Air, but *Æther*, and as such it would follow the circular motion of the whole *Æthereal* Region, and not be moved either upwards or downwards, unless *per accidens*. 2dly, The Air being rarefied by Watery Vapors and Earthy Exhalations, some other part of the Air is forced into those places of the Elements of Water and Earth, which the said Vapors and Exhalations left, when they became such; and by the same Vapors and Exhalations may the Air also be moved sideways or upwards. Neither can the Air, though in its upper Region, well be moved far upwards; bycause at its termination or confines it must meet with the vast Region of the *Æther*, which being mostly continuous, and in some measure contiguous is incapable to receive it for want of place; besides its excluded by the vastly swift and forcible circular motion of the *Æther*, whereby the Air must of necessity be reverberated, as the Smoak of a Chimney by the Wind.

176. The last necessary Query is, whence are derived those intermissions between the Air, Water, and Earth, which of themselves would conti-

Due quiet enough? Its answered, That besides the reverberating motion of the *Æther*, the Sun's Fiery *Æthereal* flaming rayes or particles continually force the particles of the Air into the Water and Earth, driving thence those Vapors and Exhalations, whose room afterwards the Airy particles do possess, and the same Vapors and Exhalations are by the same beams as frequently returned back, which drive out the Aereal particles again; so that there is a continual intercourse between the Air, Water, and Earth. But what moves the Sun beams? Its answered, the continued rapid motion of the *Æther*, which is the *primum movens naturale* of all motions in the Universe.

177. *Rest* or *Quiet* is natural and congener to Quantity, I mean a Body extended into length, breadth and depth; bycause there must have been *Rest*, before you can suppose or imagine motion; consequently all motion is violent to quantity: Consequently also, as *Rest* is natural to (that is, the nature or first property of) an universal quantitative Body, so all particular Bodies derived thence, whether less compound; as Air, Water, &c. or more compound, *Rest* must be natural; bycause a derivative must follow the nature of its Primitive. 2dly, The *Chaos*, universal quantitative Body, or huge massy Lump must thorowout be all similar, and continuous. 3dly, Continuity *Simpliciter* and originaly is an undivided extention, that is divisible into contiguous parts; or otherwise, its a cohesion of Extention *quatenus* divisible; and contiguity is an extention actually divided into parts or particles, apposed, that is lying close one to another; so that Continuity in this Sense implies a relation Quantity hath to Contiguity, or an undivided (*i. e.* divisible) to divided quantitative parts. In short, Continuity and Contiguity here differ only as divisible and divided, and is

no other than quantity it self put by the intellect into a relative dress, fashion, or *modus*. Continuity and Contiguity are two fold; either Similar, such as was only in the *Chaos*, and is still in the Rocky Central Region of the Earth, also in the next Region to it, and in the Stony Region next to that; but in the outermost Region of the Earth, in the Water, Air, and *Aether*, they are dissimilar, viz. Consisting in a contexture of filaments of various magnitudes and figures, lying in various positions, some straight, crooked, angular, others oblique, transvers, &c. As appears in the filaments of a piece of brown Paper, that is torn. It must be observed, that to prevent Subdivisions, Similarity and Dissimilarity do *recipere magis & minus*. 4thly, By external motion (from the Creator, speaking *ex capite hum.*) this huge lump or universal quantitative Body was divided, (or suppose I should say) comminuted, bruised, or rather crushed into parts and particles of all Sizes of extension into length, breadth and depth; that is, crushed into bits of little, less, and the least Size, also into big, bigger, and the biggest Size; in the same manner, as if you did by violent motion throw or dash an huge lump of solid Glass (which suppose only is all similar and continuous) against an hard Stone, and break it into bits (that is, parts or particles) which you must necessarily find to be of all sizes of magnitudes and figures. Please all along to take with you this comparison of the lump of Glass, and its being bruised or rather crushed, because it will be a guide in easily conceiving this whole matter by your external Sense, which is that I would aim to Steer by throughout the whole corporeal or sensible Philosophy.

178. There must then by this violent crushing of the *Chaos* be caused great numbers of the least particles (which in plain English is Dust) or par-

ticule subtilissima, that must be strait, and not globular, as you may read else where. You are not to conceive Dust to be insensil particles, as *Cartesius* expresses his *part. subtilissima* to be; bycause you may both perceiue them in the rayes of the Sun by Sight, and feel the Dust, or the least particles by the subtil feeling of your Eyes. 5thly, Besides the Dust that must happen in the crushing of a lump of Glasse, you must also find lesser bits of a strait, round, oval, almost oval, and of various angular figures, and little bits of near the same figure with the lesser, tho' fewer among them that are globular. As for the great, greater, and greatest pieces, they must be most angular of several figures, *viz.* triangular, quadrangular, &c. All which figures you must conceive to have been caused at the same instant with the parts and particles of the *Chaos*; bycause that could not have been crused into particles, but at the same time they must have had several figures; as appears in the instance aforesaid of the crushing together of a lump of dry Clay by the hollow of your hand and fingers. The first that flies out between your Fingers is the Dust or Dusty particles, next the lesser particles or bits, and next to them the little bits, whereof some will be globular, and others angular, though the bowls of the little particles may be fewer, and not so little as the lesser particles, and it may be some as little. Upon the opening your hand you see great pieces, next greater, and in the middle of them the greatest. 6thly, The reason of all those different comminutions of the said lump of Clay into particles of various sizes, figures, and motions, *viz.* of the outermost or superficial next to your Fingers and plane of your Hand being crused into the least particles or dust, and next to these into lesser, and next to these again into little, the next into big bigger and biggest about the center of the said lump

lump of Clay, is; bycause the crushing force comes *ab extra*, namely from the plane of the Hand and Fingers, which force being much stronger upon the superficial cirrounding region of the ball of Clay, crushes it into dust or *particula subtilissima*, and as the crushing force of the Hand and Finger become less and less, the further it passes from the surface of the ball of Clay towards its centre, so those particles and parts must be bigger and bigger, and the biggest about the center; bycause the crushing force is least there. 7thly, Its made plain by the foresaid instance of the crushing of the Hand, and may be by many other experiments, that the *part. Subtilissima* rather *corpuscula minutissima*, or dusty particles must in their greatest *congeries*, or numbers (for they are all definite) be in, or possess the outermost or superficial region of the *Chaos*, bycause (as I instanced in the ball of Clay) they receive first the strongest and most impetuous force from the external Agent or *Motor*, which is the Creator (speaking *ad captum hum.*) then the next region must be possessed by the lesser globular and angular particles, (and probably some dusty particles between them) among which must also be some of the least angular particles, and under them nearer to the center the grosser globular, and angular particles with dusty particles between them, and so on. 8thly, If you will suppose, that the foresaid external force is removed soon after the having crusht the *Chaos* into those various pieces and least bits, then you must infer, that all those dusty particles, and all the others must necessarily settle to *Rest* again, as they were before, in the same manner as the Dust of the Earth being violently moved by the Wind, must and doth settle upon the ceasing of the Wind; wherefore all motion is violent and not natural. I ought to take notice of the uncouthness of the expression of dusty particles, to which I was encouraged by the first of *Genesis*, where the Body

of Man is mentioned to be formed out of the Dust, that is, dusty particles of the Earth, which being the least indivisible particles renders it plain by that Text, that Man's Body was formed out of *Atoms*. 9thly, From what is premised in this next foregoing 8th Paragraph, this pious inference may be made, *viz.* The World framed as it is now, consisting or depending in its existence upon *Rest*, and *Motion* impressed by the Creator, can subsist no longer, than until he shall please to withdraw that *Rest* and *Motion*, and consequently we must own God's preservation in the continuance of that motion to be as necessary, as his first motion was in the Creation of the World; or if you will not grant that, you must allow, that God's motion first impressed upon Bodies is finite, and will last only to his determined time. But *Cartesius* seems to intimate, that God having once impressed a motion upon the parts and grinded particles of his Quantity, it must necessarily continue for ever, and consequently become natural, for which reason he calls that motion *Nature*, as if God would part with so much of his power in motion to his imaginary quantity to make it (*volens volens*) perpetual. If motion be infinite according to *Des Cartes*, than the World is infinite, which contradicting the termination of the Universe so oft mentioned in the sacred Pages, must leads us to Atheism and impiety, for which reason many Learned Divines do reject that sort of Mathematical Philosophy. To me there seems no other way to avoid the foresaid incongruity, than by supposing that God in the Creation of the World did say in manner of expression used in *Genesis*, *Let there be motion* upon the Earth or *Chaos*, the force whereof was gradual, which force of motion as I pretended to explain before, must be most impetuous upon the surface of the *Chaos*, and gradually lessen

lessen until it reaches the centre, as it is observable by our Senses in all other motions (that must and do take their Law from the first Universal motion) which the nearer they are to the first *impetus* of the *motor*, the stronger they are, and do afterwards gradually lessen, until those motions quite vanish or cease, as appears in a Man's throwing a Stone out of his Hand, or the slinging an Iron ball out of a Cannon; wherefore you are likewise to suppose, that this first motion which the Almighty hath impressed, is so forcible, that it may continue so many Ages, as he hath in his transcendent Wisdom decreed from all Eternity. Lastly, You must conceive, that this first original motion, though so very forcible, must in a great number of Ages grow less and less, which cannot be perceived except in several thousands of Years; so that if it can be perceived in this present Age, that the Stars have changed their places, though only in very few Seconds, or that the Sun is moved in very few Seconds slower, than about the Age of *Ptolomy*, or of the *Chaldeans*, or that the Life of Man and of all other Animals (Life consisting only in motion) is shorter now (generally speaking) than in the time of the *Patriarchs*, Ancient *Romans* and *Assyrians*, the World must necessarily have an end; but if all motion is natural, not violent, nor occasioned by external force, then the World must be infinite. 10thly, From this impetuous crushing upon the surface of the *Chaos*, as also from the vast extent of the Heavens or *Æther*, Air, and Stars, it must follow (supposing them all to consist of *Part. Subtilissima*) there were incomparatively more of those particles to be made, than of other grosser, out of which the Earth and Waters consisted. 11thly. To me nothing seems more incongruous, than that the Stars being continuous Bodies, should consist of *Part.*

Subtilissima or Dust, being the minutest contiguities, which our Senses do assure us to be impossible to hang together, as is evident in dust, which the least motion of Wind doth disperse into Millions of distances from each other, much more must those Starry Part. *Subtilissima* be instantly dispersed by a motion beyond all comparison swifter, and more violent. Can it be imagined, that a Bushel of Ashes can be moved together in a heap, without being bound together by a continuous Body cirrounding them? But the Bodies that cirround the Stars are the Globuli, being but little less subtil than the Part. *Subtilissima*, or almost as subtil contiguities as themselves, between which they must of necessity by a rapid motion be instantly dispersed; so that this must be a *Suppositum* less *Supponendum*, than the Stars to be made out of Pancakes. 12thly, A greater swiftness to the bigger globuli than to the lesser cannot be allowed; bycause if the Part. *Subtilissima* are of the swiftest mobility by reason of their minuteness, the globuli minores being less minute than the Majores must necessarily be more moveable than these. 13th. The Earth above the Central Region can in all probability be only huge Rocks, lying close together, bycause (as hath been proposed) the Chaos being a continuous hard solid rocky Body, before it was divided or crusht, by the lessened force of crushing, when arriving to the Central Region, could only divide it into the greatest hard rocky Bodies, and consequently by that rule of crushing motion the next Region to it must be smaller Rocks, and the next to that great Rocky Stones lying contiguous to each other, where must begin the exterior Region of the Earth, in which minerals and other subterraneous Bodies are engendred. Water cannot be thought to go farther than this exterior Region, bycause it is of too thick a Body to enter between

tween the close crevices and contiguities of the Rocky stones; neither can Air, or the most subtil particles be conceived to penetrate thither, because they can be of no use there, and *natura nihil facit frustra*. Wherefore the central and near central Regions, are no other than the remains of the *Chaos*. more or less divided or crushed, and serve only for an ultimate prop to support the others.

179. If *Rest* is natural to bodies, all motion must be violent, consequently finite and determinable, as well in the *terminus a quo*, as *ad quem*; that is, if any body hath a beginning, it must have an ending; consequently (as is said elsewhere) the motion of the *Æther*, Stars, and all other Bodies, as they had a beginning must have an ending; but if motion be natural in conformity to *Aristotles* Opinion, it never had a beginning, nor ever will have an end, and from that reason he infers the World to be Eternal; and as he supposed Motion to be Natural, so he doth *Rest*, as appears by his definition of Nature, in defining it to be the *Principium motus & quietis*, which is a contradiction; for if Nature is a *Principium* and a *terminus a quo*, it must have a *terminus ad quem*, which is *finis*. Likewise *Cartesius* states Motion to be perpetual, in asserting it never to lessen, much less to end; but is transferred from one to another, until it's return'd to its first Original, which is both impious and not intelligible, as you will read in the next Theorem.

180. Motion cannot be transferred from one body to another, no more than Figure, to which the Peripatetick Maxim doth in some sort correspond, viz. That no accident can migrate out of one subject into another. True it is, one body may cause its accident in another body; for instance, a Seal may cause (or impress) its figure in a thousand pieces of Wax, but the figure of the Seal doth not commigrate from the Seal to the Wax. In like manner, he that grates his finger over all the strings of a Gitarre, successively

sively from one string to another with a continued stroke, doth cause a motion in each string, but the motion of the fingers is not in any wise lessened thereby, but still continues from one string to another, which thwarts that *Cartesian* fundamental Maxim, that as much motion as is transferred to another, so much motion is lessened in the body that transfers, which they make out thus, there is one Universal and Original motion impressed by the first *Motor*, upon the Universal and first *Mobile*, which suppose in the forementioned instance of motion in the Gitarre strings to be the *particule subtilissima*, moving the Air or *Æther*, which being always in motion (and so consequently the first motion of their *particule subtilissima*, by their own position must be intirely lost, as having transferred it to the Air or *Æther*) moves the animal Spirits in the Muscles of the Arm and Fingers, that move the Gitarre strings; now so much motion as is transferred, so much motion is lessened in the *particule subtilissima*; the motion in the Gitarre strings, upon the ceasing of their shaking is transfer'd again to the Air, thence to the *Æther*, and thence to the *particule subtilissima* again. What an abundance of Incoherencies and Repugnancies must here follow? If at any time Storms of Wind, Thunder, Lightning extended oft through many Regions, Conflagration of many Cities caused by Enemies, or otherwise great Battels, roaring of Muskets and Canons, and vast inundations should happen at one time, this were enough to take away, or borrow so much motion from the Air, *Æther*, and *particule subtilissima*, as to make the Moon stand still, until all those motions were return'd again. How far fetch'd is this, that a Man cannot go to stool, or make water, but he must borrow motion from the *Æther* and *particule subtilissima*? What an Embarrass and Confusion must all this make in a Philosophers noddle, and of how little use can this be to a Physician? True it is, to
quantity

quantity can never be added, or diminished from it, being always constant, so that since the Creation Air, Water, and Earth, have not lost one point of extent, nor are they augmented. But because quantity is perpetual and constant, it doth not follow, (as *Cartesius* pretends) that motion, figure, &c. Are so likewise, these being variable accidents (because they did *accidere* to quantity after its Creation) can cease and be renewed again, without Clambring up to the Firmament. The same body may come to *Rest*, and be moved again, and figure is variable a thousand times in a minute.

181. Though *Natural* properly implies what was by Nature Originally affixed to the first and Universal quantity, viz. The *Chaos*, which was *Rest*, and in that signification all motion is violent; yet by an improper and tropical usage, what was afterwards, by division or motion, first made or impressed upon the said quantity, Philosophers have thought fit to call *Natural*, and in this sense all motion is termed by them *Natural*; whence it may be said, that motion is *Natural* to the *Aether*, Air, Fire, &c. Though were it not for the continuation of that motion, which was first impressed upon them, they would return to, and continue all at *Rest*. 2dly, *Natural* is by Philosophers intended to express the property of a body; thus it's said, Purging, Sweating, Vomiting, &c. Is *Natural* to such a body, meaning, that it's the Nature of; Or, *Natural* to such or such a body. Wherefore I have been, and shall be forced sometimes to use the Words *Nature*, or *Natural* in that improper signification. Notwithstanding this distinction, I am of Opinion, that properly speaking, *Rest* is natural to all bodies, whether Simple or Compounded, and consequently can never be destroyed or annihilated, but it may be suspended by motion, and naturally all bodies and their particles do tend, and must
return

return to *Rest*, which imports no more than *Manſio*, remaining, or abiding undiſturbed in the ſame place or *locus*, whether internal, or external; ſo that it cannot be conceived, that any body, or its particles can have any the leaſt inclination or tendency to be diſturbed by motion, which commits violence upon them.

182. The *Æther* (as I mentioned before) is the *uniſverſale primum movens* of all bodies, Simple or Compound; that is, the *Æther* is the firſt, original, primitive, and principal, ſole, moving Cauſe of all bodies, and the Air is the uniſverſal ſecundary, derivative principal, ſole cauſe of paſſive motion in all bodies; So that all local Motion, Alteration, Putrefaction, Corruption, Augmentation, Dimintution, Rarefaction, Condensation, &c. (Which are all either internal, or external local motions) are cauſed by the *Æther*, or Air; no animal can ſtir any Muſcle, or move any Joint, but by the motion that's cauſed in the animal Spirits, by the Air moſt commonly, and ſometimes by the *Æther*. Fire, whether culinary or celeftial, doth warm, heat, ſcorch and burn by the motion, that's impreſſed upon it by the Air, or *Æther*; water is moved by the Air; and ſo the like in all bodies. Without granting this foreſaid theoreme, Motion is not in any ſort explicable, nor the cauſe of continuation of motion in bodies that are thrown out of the hand, or other bodies.

183. There are but three Elements (improperly ſo called, being rather *Elementata*) viz. *Æther*, *Lympha*, and Earth. *Æther* differs only from Air accidentally, as *Lympha* doth from water, that is, the one is leſs pure, and leſs mix'd than the other; though both *Æther*, *Lympha*, and Earth are all intermix'd, the one with the other in ſome proportions, though much leſs than in bodies that are Compounded out of them.

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184. Neither do I find *Cartesius* framed more than three Elements, viz. *Materia primi Elementi*, or *minutiae indefinite divisibiles*, by his followers called, *particula subtilissima*; *materia secundi elementi*, or *Sphaerula*, otherwise Named, *globuli majores & minores*; and *materia tertii elementi*, or *particula crassa* of several angular figures, which are all three framed from the Divisibility of Quantity, and which for that reason he makes (though improperly) the first property of it. These being meer remote Names, it's more convenient in their stead to make use of things, or the least mix'd bodies for Elements, to derive from them the constitution of the more, or the most Compound and mix'd bodies, whereby we shall avoid many incoherencies, and incongruities, into which they must necessarily plunge themselves. 1. *Des Cartes* tells you, he could as conveniently have woven his Philosophy out of the *Chaos*, and the first Chapter of *Genesis*, but I doubt not, he found too much repugnancy between that and his principles, and therefore was forced to abandon that enterprize; and to add a greater impiety to his contradiction of the sacred Bible, he Atheistically insinuates the World, was not solely Created for Man; And for whom should it have been more, than for the likeness of God? Besides, that notion is the more impious, for as much as it subtracts Mans gratitude to God, for his transcendent goodness in Creating the World, and all therein is for the use of Man, which is so oft expressed throughout that holy Volume. 2. He allows no figure to his *particula primi elementi*, though he doth to the second and third. 3. He constitutes the Stars out of a *Congeries*, or heap of his subtilest matter, which, viz. Stars, Corporeal Philosophy cannot allow to be simple bodies, so loosely set together by the continuity of the said subtilest bodies, which the rapid Motion of the *Aether* would much sooner disperse,

perfe, then a great wind doth an heap of afhes or fand. He feems to ftate *Divifibility*, the firft property of quantity, whereas *Mobility* muft precede it; bycaufe by motion quantity is divided. 5. He affirms Circular motion to be the firft motion, whereas it's a ftrait motion is the Original and firft of all others, for as much as a ftrait or right Line is accounted *Prior* to angular and circular Lines. 5. He infers his Mathematical Elements reciprocall and alternatively mutable into each other, fo as the *particula crassa*, confifting of all forts of figures (fpherical excepted) can and do change into fpherical, and thefe into *particula subtiliffima*, to which he has allotted no figure, and confequently is loft; whereas our fenses inform us the contrary in the Elements of bodies, *viz.* That the Earth cannot turn into *Lympha*, nor that into *Æther*. Neither can a round figure be reduced to angular by a circular motion, though by a ftrait it may. Nor can an angular figure be aptly reduced to a round, but by a circular motion; fo that of neceffity there muft throughout the whole univerfe be allowed two univerfal motions, *viz.* Strait and Circular, which is inconfiftent. 6. The formation or conftitution of the Sun and Planets, as I mentioned before, are by him afcribed to an accumulation of *particula subtiliffima*, got between globular particles, moving about in fo many whirl Pools or *Vortices* about the Sun, which makes a more violent and fwift whirling of the little Sky balls than any of them, fo as to force the Planets, and their whirls to run round him, the Sky here being called the firft Heaven; the fecond Heaven (commonly called the Firmament) he difpofes of for a manfion of the fixt Stars, of which ufually are accounted vifible one thoufand and twenty, though fometimes a new Star has appeared, as that which was obferved in the Year 1672. and another before that in 1571. to each of which
fixt

fixt Stars a whirling orb is allowed ; now the rattling and confusion so many whirling orbs must needs make, is argument sufficient to prove the vanity of those imaginary Whirl-pools, and to introduce a more probable Opinion, that all the fixt Stars and Planets (among which *Cartesius* accounts the Earth, according to the Antient Opinion of *Plato* and *Pythagoras*, revived about two hundred years since by *Copernicus*) are all moved by the motion of the *Aether*, as the knots of deal boards framed into a great wheel, containing several other lesser wheels within it, are moved, or as a Ship by the water flowing round ; And that the fixt Stars and Planets are all distinct *Ethereal* fires, that burn, flame, and give light, but consisting of purer *Aetherial* viscous oily particles, than a culinary Fire, or a lighted Torch, to which Opinion our senses seem to incline us, by a Comparative sensation, viz. As these sublunary fires are perceived by the touch to heat, scorch, and burn, and by the sight to flame and give light, so the Sun (of whose Nature all other Stars are granted to partake) heating, scorching, and burning, as the sense of feeling doth attest, its flame and light moving the sight, may reasonably incline us by the said comparative sensation to believe, the latter is as much a fire as the former, but of a greater purity.

185. As for his *Particule Ramose*, *Striate*, (skrew'd) *Rigide*, and several others, are well enough forged and allowable, did they but explain matters clearly and without Contradiction.

186. The *Aether* being the first Body, that was by motion (as you have read before) made out of the *Chaos*, being virtuated by the Creator with a most forcible and rapid motion, soon pierced through most of the parts of the said *Chaos*, separated the Earth from the Water, and retired it self from both ; but being intangled between them, could not but draw a great proportion of

of the Water and Earth with it, before it arrived to its retirement in its own proper Region, and also leave a great proportion of its own particles copiously intermixt with the particles of the Water (which before being solid, was now made fluid) and the exterior particles of the Earth. The *Æther* thus beset throwout its whole region with mixt particles of Water and Earth, the grosser of them being unfit for a rapid circular motion, were easily thrust down to the lower part of its region, where of necessity must happen a separation, as being too gross to follow the motion of the superior vast part of the *Æthereal* Ocean. At that separation began the Region of the Air, being no other than the *Æther* clog'd with the grosser particles of Water and Earth.

187. The subtiler particles of Water and Earth were still in great Proportions disperfed thro-out the Region of the *Æther*, which by continuation of its rapid motion (in the manner of a violent churning separating the flower of the milk from the grosser part) did separate them into great and various Streams, that became Orbs to the several Planets and fixt Stars, that were formed out of the most congregated parts of those grosser viscous particles. But here I must put a stop, not designing to break into Astronomy in this small Treatise.

188. From the premisses is to be deduced. 1. That no Element (some part of the Earth excepted) is now existent in its purity and simplicity. 2dly, That though mixt, they are less mixt in their proper Regions. 3dly, That Fire, is no Element, but a natural compound, that burns, flames, and gives light, not having so little of mixture, as an Element now hath in its proper Region. That its compounded out of the Three forementioned Elements, appears by its ultimate dissolution in the burning of Fire made
of

of Wood, that is dissolved into Smoke, (being the greatest part Air, some Earth, a very few Watery Vapours) and Ashes being the most part Earth, with some little Air, and moisture. 4thly, An Element is permanent in some sort, and cannot in the least particle (abating adventitious mixtures) be augmented, diminished, or annihilated. whereas Fire is minutely and hourly destroyed or extinguished, and may be diminished and augmented at pleasure. Now whereinto a compound Body, as Fire, is ultimately dissolved, thereout its primarily or originally constituted; so that you may easily apprehend, whereout it primarily consisteth, by what is said of its ultimate Dissolution.

189. Every compound Body that contains Oil in its composition, doth burn, flame, and give light; and by how much thinner, and lesser proportion the Oil is, by so much is the flame more blazing and light, but of a shorter continuance, as is evident in the burning of Paper, Hair, Flax, Linnen, &c. Each of which being distill'd in a retort in an open Fire, doth yield a little thin Oil, and a very little acidulous moisture. Wood to the quantity and thickness of the Oil (which it will in like manner yield in a retort) it contains, and the compactness of its Body, makes a greater and more burning Fire, and of a longer duration. Bituminous Bodies, Tallow, some Gums, Brimstone, (rather burnstone) &c. Before they can or do burn, are first melted down by the Fire, (that is to kindle them into an Oil,) all which burn, flame, and give light more or less, and are of a longer or shorter continuance, according to the fineness, thickness, thinness, or coarseness of the Oil. It appears hence, that we ought not to ascribe the inflammability of combustible Bodies to *Sulphur*, but to Oil; bycause Sulphur cannot burn before its melted down into an Oil, which being consumed,

fumed, there remains only the *dregs* or *faces*, or yellow Earthy *caput mortuum*, which the foolish Chymists in their bombast Language call an *incombustible Sulphur*, and to which in other Bodies they do attribute such incredible vain boasting Virtues, that in my experience, can scarce be compared to the virtue of insignificant Ashes, or Cinders.

190. Common Salt, Vitriol, Salt-petre, and many other Salts, and some Minerals containing no Oily particles (which the said Alchymists will needs term a combustible *Sulphur*) in them, as by their distillation doth appear, are incapable of burning or flaming, which will be readily enough granted of all the rest, except Salt-petre, which being thrown into the Fire seems to increase its burning and flaming, whereas the others forementioned do diminish and extinguish both. Touching the Salt-petre *per se* that is by any Oily particles contained within it self, it doth in no wise contribute towards the augmenting the burning or flaming of the Fire; but by having its strongly resisting pores closely fill'd or cram'd, and rarefied by Fiery particles, bursting through with great violence doth (*per accidens*) cause all that sparkling, increase of burning, and flaming; which that it is so, is confirmed by melting Salt-petre in a Pipkin, or Pan, and afterwards casting it on the Fire, is then found deprived of intending the burning or flaming of the Fire, the pores of the Salt-petre being changed in figure. It is from this Qualification of increasing the power of Fire Salt-petre is called (though improperly) a Sulphurous Salt, not in any wise from any combustible matter it contains in its self, being intirely free from it. I need not explain the addition of the great power, the Brimstone and Charcoal in their mixture with

Salt-

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Salt-petre receive from it, it being sufficiently obvious by the premised Discourse.

191. *All particles are sensil*, if the Axiome holds, that nothing can be perceived by the Understanding, what was not perceived before by the external Senses, and consequently, there are no insensil particles. Probably, its objected, the Air and Wind consist of insensil particles. Its answer'd, if they do, its impossible we should know, that either of them is a Body. If you only call insensil, what's invisible, the objection holds good; but though the Air, or Wind are imperceptible by your Sight, either may be perceived by your Feeling, and the Wind moreover by your Hearing. Its replied, that though Air or Wind are perceptible in a greater proportion, the least particle is not. Its answered, that as the subtlest invisible point of a Needle may be as plainly felt as a blow with the Staff, so may the least Air or Wind, allowing for, that the latter are obtuse, and the former acure. You reply farther, that the particles of Air, or Water, that are inclosed within the pores of an Horn, or of a piece of Wood, cannot be perceived by your Senses; to which may be answered, that at *London*, you cannot perceive by your Senses the Minister at *York*, which notwithstanding you may, if you please to go near *York*; and so you may the Aery and Waterish particles of Horn and Wood' if you distil them in a Retort in an open Fire.

192. Contiguous Bodies were by motion caused out of bigger continuous Bodies; now we are to consider, how contiguous Bodies are again render'd continuous, which happens every minute in Millions of Bodies. Total *Atoms* being contiguous, consisting of the minuteſt Fibrils, by running the said Fibrils, and intangling them one into another, become continuous; and the said Fibrils being by external force or motion divel-

led and disintangled again, return to be contiguous, which former among *Fusibles*, is called Melting; as for instance, Gold dust, or any other Metal that's reduced into contiguous least particles by *Amalgamation*, or immerfive *Calcination*, and placed in a Crucible over a violent Fire of Charcoal, their minutest Fibrils are by the most forcible and rapid motion of the Fiery particles, divelled and expanded, whereby they easily run into one another intermixed, and become a continuous fluid Body; the Fire being withdrawn, their mixture being in obtuse Angles, and consequently thereby render'd fluid (as hath been said before) become acute, and consequently hard and solid, which by the same Fire may *series quoties*, by breaking those acute Angles and rendring them obtuse become fluid again. Hence it may be reasonably inferred, that the *Æther* is made out of the greatest proportion of the contiguous Dusty or subtilest particles (that were first made out of the *Chaos*, by being render'd continuous by the most rapid and forcible motion impressed on them by the first *Motor*, that is to say, the said particles by being melted, or by fusion become continuous; but then you must also conceive, that their most subtil Fibrils (in being melted or made continuous) are so loose, rarely and widely put together, that their contexture is so full of pores, that the finest Lawn, or thinnest Glass comes incomparatively short of it in Rarity; so that the *Æther* as is said before, must be most fluid, bycause its most subtil Fibrils being so loosely Woven together do easily separate, and consequently do as easily come together again. The *Æther* is most transparent of all Bodies, bycause its the fullest of pores. It is not brittle, bycause those minutest Fibrils are soft, pliable and yielding, whereas those of Glass are gross, hard, and rigid, and consequently brittle.

193. *All Motion in all its kinds is immediately, and primarily caused by the Æther; mediately and secundarily by the Air. It is the Air moves your Hands and Feet, moves the Diaphragm in your Respiration, moves all the Animal Spirits, is the cause of the continuation of all motion. It doth by motion engender, and preserve and corrupt all mixt Bodies, &c. This Theorem contains the summ and substance of all Sensible or natural Philosophy, and requires a very large explanation, together with the Solution of all Quære's, and Objections: But I have already by far exceeded the bounds of my intention, and of the Booksellers also, and therefore am obliged to put a stop here.*

Of Moral Philosophy, strictly so Call'd.

194. **T**O discharge what is expressed in the Title Page, obliges me to some sort of of an Abbreviate Discourse of *Moral Philosophy*, implying a *Prattial Science of the voluntary Actions of Man*, in order to direct him in the conduct of them, by means of *Virtue* towards the obtaining his *summum Bonum*, or highest Good, and greatest Happiness.

195. The pedantry of moral Philosophers, out of a petulancy of exercising their Faculty, make its display into object, subject, passions, and their divisions; also into virtue divided into Cardinal, Sub cardinal, Demy Virtues, besides other subdivisions, and such kind of Flourishes, which may well enough fit the capacity of Scholars; as if

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Morality

Morality, or good Manners, and Virtue, were only to be imparted to them, and to be found no where else; whereas to the contrary, were a Man to look for Frauds, Vice, and the extremity of Debauchery there is no necessity of going farther, than the School-Gates. of *St. Omers, Orleans, Salamanca, or Boionia*, where from the Mendicant Friar, thro' the degrees of the learned Jesuit, Canon, and Bishop, to the very Arch one, you may be abundantly furnisht. On the other hand, Curtesie, Friendship, fair Dealing, Faith, and Honesty. may as frequently be observed among the Peasants, Mechanicks, and the rest of the Populace, as among the more lofty Ranks.

196. Moreover considering, that where an Art, Science, or Faculty, is hamper'd with a great many Divisions, Sub-divisions, Sub sub divisions, Theorems, Rules, Maxims, and what not, the result can be no other than confusion, and utter neglect and contempt of any of 'em. The Faculties of Physick, and the Law, give pregnant Instances; where, as in the former abundance of Remedies and Medicines, do rather very oft cause Diseases, than cure them; so in the latter, the multiplicity of the Laws are not the least cause of numerous Law Suits, Discords, and Differences, and chiefly of Petty Foggers, exceeding the number of Caterpillars in a blyting Season, blowing the Coals, and setting whole Parishes and Towns into a flame. A Law, tho very obscure, is very oft render'd much worse by an explanatory Law, in as much as the words used in the latter, shall be made use of by some pick-hole Lawyers, to intangle and make the former more dubious: But where Laws are few and comprehensive, and the Interpretation left to Judges of Integrity, whom a Government will be careful to prevent from Corruption and Bribery by an honorable Salary,
or

or a proportionable Punishment, there every Man enjoys his own, lives amicably with his Neighbours, and has the satisfaction of a sedate, quiet, and easie Life.

197. The Turks, Barbarians as they are, their *Cadi's* (who have their Tribunals in sundry places of a Town) by their few comprehensive Laws, decide real and personal Actions and Injuries, at the instant, upon the spot between the parties themselves, without any assistance of Prolocutors or Lawyers, other than of Witnesses. The *Chineses* and *Japanners* are governed by fewer Laws, and other *Indian* Principalities, by much fewer. *Suetonius* tells you, that *Julius Cæsar* had design'd to reduce the Civil Law to a Mediocrity, and out of the innumerable and diffused abundance of Laws, to compile the best and most necessary of them, into very few Books.

198. Before I proceed farther, give me leave to offer an instance of the Inconvenience of the multiplicity of Laws, and the Mischiefs of some pick-hole Lawyers. I have read it related in *Justus Lipsius* of *Galeas*, Duke of *Milan*, who was oft told, that there was a cunning Lawyer, that knew craftily to set people together by the Ears, and not only run them into Law-Suits, but to prolong and make the most of them. The Duke sends for the Lawyer, and tells him, he owed his Baker a good Sum of Money, which he had no mind to pay, withal asking him, whether he could defend him at Law from the payment of it? The Lawyer roundly answered him, he both could and would; to whom the Duke replyed, now by your own confession, I do convict you to be a crafty Knave, and a Firebrand among my Subjects, I do sentence you to be Hanged; and accordingly he was executed soon after.

199. The forementioned Definition in the first Paragraph of *Ethicks* implies, that every Man is to be guided by steps in his voluntary Actions, to attain by Virtue, 1st. a *particulare bonum* or good, which is his *finis proximus* or nearest end. 2^{dly}. an higher *bonum* being a *finis ulterior*; and 3^{dly}. a *summum bonum*, or the highest good, which is his chief greatest and last end or *finis*. By Virtue is meant an habit of acting Voluntarily according to *Recta Ratio*, or right Reason. Every Man that acteth voluntarily, doth act for some End, which is *bonum Verum*, if Virtuous, or a *Bonum apparens* and *falsum*, if vicious; because *Bonum*, being in its nature simple and not divisible, must either be absolutely *Bonum*, or *malum*, as any sort of *Bonum apparens* is.

200. *Bonum* or Good, is vulgarly described to be what is convenient or agreeable to every one, according to right Reason. So that *Bonum*, as I said before, being simple and indivisible into kinds or *species*, cannot be divided into *verum*, (true) *utile* (useful) *jucundum* (pleasant) and *honestum* (honest:) Bycause what is according to right Reason true, cannot be apparent; or what is useful in that sense, must be pleasant, and honest, that is estimable. Wherefore *verum*, *utile*, *jucundum*, and *honestum*, cannot be *Species*, but inseparable Properties or Affections of *Bonum*. It follows then, that *Bonum* must necessarily be *verum*, *utile*, *jucundum*, and *honestum*; for if it be not *verum*, it must be *falsum* or *malum*; if not *utile*, it must be *inutile*, or of no use; and if not *honestum*, it must be dishonest or reproveable, and of no esteem or value. *Honestum* is what right Reason doth make estimable or valuable, or, as we commonly say, respected, to and upon which she doth always, as a reward, annex or bestow Honor; so that whatever is Honest, is Honourable.

201. The *finis Proximus* (which I ought rather to name

name *finis Infimus*) is *Bonum singulare*, or *particulare*, to which every particular Virtue doth tend) doth imply, there must be an *ulterior* or *superior finis*, (which is *Bonum universale, commune, or publicum*. if an *ulterior* or *superior*, then there must be a *finis ultimus*, or *summus*, which is the *summum bonum*, to which you cannot arrive without attaining the *bonum publicum*, as will be hereunto next explain'd to you. As all *singularia* or *particularia* together (*collective*) make an *universal*, so all and every particular *bonum* (to the attaining of which, a man cannot but trust direct all his virtuous Actions as his end, tho the lowest) must naturally tend to, and must actually constitute a *bonum universale* or *commune*, which is the publick or common Good, and that is the *finis ulterior* or *superior*. How and in what respect by virtuously Acting, and continuing so to act, you do arrive to the obtaining the *summum bonum*, will be set down hereafter.

202. Next I am to shew, how and wherein every virtuous particular Man, by his voluntary Actions, aiming at his particular Good, it is impossible, but naturally this particular Good, doth tend to the universal or common Good and doth actually constitute it. A man that is Virtuous in Frugality, being a virtu (consisting in a mediocrity between the two Extremes, as all others do, according to the saying in *Medio consistit virtus*) between Avarice and Prodigality, aims to preserve himself (and his Family, if he has any) in his Person or Being, and Estate, which is the *bonum* or end of that Virtu. Now 'tis plain, this Man must of necessity aim at and act for the common Public Good, forasmuch as by Frugality he renders his Person and Estate serviceable to the Publick Good; whereas a Prodigal, by impoverishment, doth become a burden to the Publick, especially if diseased or impotent in his Person; and

and a covetous Man doth shew himself an Enemy to the Publick, by denying his assistance in contributing to the common Good; and for that reason, that Vice is punishable by compulsion or exaction of a double Aid. In like manner, a man that is commutatively just, is so far serviceable to the common Good, as by his Justice to another he renders him the more serviceable to the Publick. In short, there is not any particular Virtue you can name, but it doth and must of necessity tend to the publick Good; if so, then the most compendious and best way in treating of moral Philosophy is, to pass over all particular Virtues, and describe only the universal Virtue, which comprizeth them all, *viz.* the sole comprehensive and cardinal Virtue, to which all others are naturally refer'd, is of directing all your voluntary Actions to publick Good, so that the publick or common Good must be the Standard of all Vertues and Vices; for instance, he that murders a Man fairly (as they term it) in a Duel, can in no wise be accounted courageous, bycause he hath done wrong to the publick, in weakning and robbing it of one of its parts, and such a detestable Action ought rather to be called a brutal madness than courage; forasmuch as it hath been frequently reported, that in the late Civil Wars, the Duellers were the first that turn'd their backs in a Battle, and consequently were the worst of Cowards; the reason is very obvious, a Murderer whose Soul, and all her faculties, being stain'd with the blackest of Crimes against God and Man, is so overwhelm'd with darkness and confusion, that he has no presence of mind (which is so very necessary in Courage) either to resist or offend a publick Enemy, especially when his Conscience doth assure him, should he fall by them, he is in danger of Damnation, which to prolong to a further time, has only so much sense left to force him to
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betake himself to his heels. This cursed Vice of Duelling never will or can be cured, as long as the just Punishment is lessen'd by a Law of Manslaughter, a meer notion, rejected by most Nations of Europe: notwithstanding, that this Distemper of Duelling in a Nation, tho' radicated and inveterated, is very curable, plainly appears by those Experiments and *probatum's*, the French King hath made against it. To conclude, it may be said, there is no other vertuous Courage, but what is shew'd in a Battle against, or annoying an Enemy to the common and publick Good.

203. On the other hand, you cannot act any Vice, tho' in your thoughts it appears only an injury done to your self, or a benefit to your self by doing an injury to another, but that you must commit a Vice, or Crime, against the publick or common good; and for that reason you may observe, the Publick hath made Laws, whereby to punish every vicious Act you can do, (so as you may be convicted of it) tho' you do imagine it to be injurious only to your self. It must then follow, that by how much more the Virtue you act doth tend to the publick Good, by so much that Virtue is to be esteem'd beyond others, and therefore the highest Virtue you can act is Courage, whereby the publick Good is chiefly preserved and defended against its Enemies; so that an ancient Roman could not attribute a greater Virtue to himself, than by saying that so highly celebrated Expression, and greater he could not say, than *Pugno pro patria*, importing, *I fight for the common welfare of my Country*. The next in degree is the Virtue of contributing the means, whereby the publick Welfare may be preserved in the supporting of it self, and defending it against the common Enemy, which may give the occasion of expressing, it is better to contribute Four Shillings in the Pound, yea, Ten or Fifteen, than be forced

ced to pay all to an Enemy, who will take strict care by pulling your Feathers clean off your back, to prevent your ever flying again thro' the weight of your wooden Shooes, ravish your Wives and Daughters before your faces, and pull your Guts out of your Bellies to hang about your Necks, if you make the least frown at it; thrust a wax Taper into your hands, manacled by a string of Beads, and make you follow 'em like dogs about the streets; take away all your Cloths, and leave you a few lowly woollen and canvas Rags to cover your Nakedness; lye on your Beds and leave you the floor; eat the flesh, and throw you the bones to pick for sustenance; force you to plough your own Lands for their own proper use: empty their Close-stools, and rub their Horses heels, besides their drubbing of your Skin, and rubbing it afterwards with Salt and Vinegar; rob you of all your Riches acquir'd by the dangers and industry of your great Merchants, whom they shall put into their own condition before they came hither; of being Pedlers of Twisters and Tooth picks, besides innumerable other Slaveries. All which has been practis'd by such an Enemy to another Nation within these 20 or 30 Years, and yet they believe these Barbarities to be a gracious and merciful treatment of Hiereticks (which they term you to be) that deserve to be intirely destroyed, according to the present Usage. Now consider seriously, which is the better, to pay Nineteen Shillings in the Pound, and to continue Master of that one Shilling, to leave all, and become Refugees to Bogs or Highlands, to feed upon Roots, where still you may say you are your own Master, or pay Twenty Shillings in the Pounds to an Enemy, and become unspeakably worse than *Algerine* Slaves, all which Miseries must come upon you by the extremity of Vice, in not directing all your Actions to the common or Publick Good.

204. Before I proceed, two Objections that may be offered against this Discourse of a comprehensive and universal Virtue, ought to be removed. The one by the way of Query, how can Virtue in the Universal be taught without being divided and subdivided into particular Virtues, and subjoin'd with particular Rules to attain and follow them? This is also best answered by Question; How can a Man learn to carry his Body well, or acquire a good Seat on the great Horse, or attain a good behaviour in dancing? Certainly not by Precepts or Rules, but by example, use and custom. Every Man if virtuously disposed, is educated to it either by example of his Parents, or Friends, and other Persons abroad, and so by his own use and custom grows up to it. Or in short, the six latter Commandments of the Decalogue, contain succinctly all Virtues, Vices, and perfect Directions concerning them.

205. The second objection is, that the treating of this comprehensive Virtue, whose end is *bonum publicum*, doth more properly belong to Politics than *Moral Philosophy*; its answered. 1. That Politics is a part of *Moral Philosophy*. 2dly, That the difference of *Moral Philosophy* is great from Politics strictly so taken, which former doth Discourse of the common good as being attainable by Virtue, and a *finis medius* to a *finis ultimus*, which is the *summum bonum*. 3dly, Politics doth make use of coercive Laws to constrain Men to act for the common good; whereas here its treated of as attainable by voluntary virtuous actions, which is more noble and becoming to the Soul of Man.

206. Its convenient in this farther proceeding, to corroborate the assertion of the forementioned comprehensive Virtue, by applying my self to that great Precept of Holy Writ (which cannot be termed Politics) and which there, is said to be *instar omnium*, viz. Love your Neighbour as your self; your Neighbours are a whole Nation, where-
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of you are a part. To love is to act for the good of all your Neighbours, and that is plainly to act for the common Good; and in so acting, you love and act as much good to your self, as being a part of the Common or Commonalty, as you do to the commonalty; so that this is plainly *loving your Neighbour as your self*.

207. As the Romans highly rewarded all, that acted signally for the common Good, so they as rigorously punisht the least fault against it, even to the suspicion of it. Wherefore as long as this comprehensive Vertue was generally practiced among them, so long they flourisht, subdued their Enemies, were potent and famed over the whole Universe; but as soon as some of their great Officers as *Consuls, Proconsuls, Prætors, &c.* did underhand act for their private Good and Interest, as *Cinna, Carbo, Catiline, Marius, Sylla, Pompey, and Cesar*, taking example each from the other, that Government began to sink and dwindle by degrees, until it was quite extirpated by *Octavius*; though the first break-neck of that famous Republick was to be attributed to the Senate's parting with so much Authority to the Populace gathered together in a Tumult, as to chuse their own heads, or *Tribuni plebis*, with a power to propose Laws to be confirm'd by the Senate, which if they refused, by menaces or otherwise were forced to it; and without the influencing of those *Tribuni* (by whose means they allured the People to their side) neither *Marius* nor *Sylla*, nor *Cesar* could ever have shaken the least pillar of that Republick. So that two Powers divided out of one can never hold longer, then until the one endeavouring to destroy the other, at length a third Power comes, which was *Cesar*, who subverted them both.

208. In a Prince this premised Vertue is more necessary, inasmuch as he hath, and ought to have

have the greatest share in the Common or Publick Good, and consequently enjoys the greatest benefit of it; and where ever a Prince is failing in this virtue, so as to divide his own good, or particular Interest, from that which is in common between him and his People, by preferring his own Ambition, or revenge in making an unjust War upon his Neighbours, that race hath been observed never to continue long, as may be remark'd in *Philip the Second of Spain*, *Alexander the Great*, and many antient *Roman Emperors*, among which latter there is not a Branch remaining, and their great Power reduced to nothing, which is not to be doubted of any other Prince, out of ambition aspiring to an Universal Monarchy, though thinking himself actually as great as the Emperor *Charles the Fifth*, or his Son *Philip the Second*, at least in *posse*.

209. What ever Prince pretends to an Universal Monarchy must of necessity (in my little Opinion) make these Steps. 1. He must Establish a Religion, which implies an Obligation or Duty upon a Man to obey all the Laws (among which that of obeying their Prince, Head, or Sovereign, in all his commands, is one of the chiefest) the Supreme or Divine Power shall impose upon him, for which he is promised by the same Divine Power to be rewarded with an eternal Life and Happiness. This impression upon the Intellect renders a Man not only prone to hazard his Life, but oft very willing to lose it; for if it be true, that *Natura est sui preservans*, there is no man but a Fool or a Madman would run the risque of losing his life, tho forced to it by corporal Punishment or reward, were it not for the great recompence that is promised him by a supreme Almighty Power. Experience or matter of Fact, is an argument beyond all that can be drawn from Reason, which informs, us that from the Foundation of *Rome* the Courage of the *Romans*

mans was very insignificant, until *Romulus* and *Numa Pompilius* had forged them a Religion, consisting of one great God, and many lesser, in whose Names many Laws were made, some tending to the preservation of Peace among their Subjects, others chiefly prescribing several ways and modes of Worshipping those Gods, & imposing another Law of no less importance, of strictly obeying the Wills, Commands, and Ordinances of their Prince; for all which performances every Man should, after this Life, be received as a Companion among the Gods; and if he had been most signally Religious and Virtuous, should be Installed a God, or Demi-God. The Republican *Romans* improved this sort of Religion, in exalting it to the highest Superstition, by increasing the number of Gods and Temples, adding to their Worship various sorts of Sacrifices and Immolations of Animals, by the inspection of whose Bowels, they pretended by their soundness, or diseases and stains, to know, whether their Actions intended by them should be prosperous or not, and accordingly regulated themselves in their proceeding or desisting. After any prosperous success, they seldom failed of rendering Thanks to their Gods by their Sacrifices and Immolations. They oft consulted their Oracles, being answers left by their Gods (whilst living) in writing, or inspiration with the Priests of several famed Temples. All which was by Education, Example, Use, and Custom, so effectually infused into every Man, that its no wonder if those *Romans* became the most valiant Men in the Universe, especially when also taught by Example and Custom, that the highest and most comprehensive Virtue, consisted in an habit of acting all things towards the Common Good or Welfare. The whole context of that sort of superstitious Religion and Morality, was so nicely and strictly observed by all those *Romans*, that the

the least contempt or neglect of the former or latter was most severely punisht; so as the speaking only a few contemptuous Words against any of the Gods, as also the acting against the Publick Welfare, was unpardonably punisht by Death. And without this strict observance of their Religious Worship, it would have been as impossible for those *Romans* to have conquered almost three Fourths of the whole Universe, as a Man by strength to vanquish an Elephant. Here a Parallel may be offered between those old superstitious *Romans*, and these modern *Catholick* ones; as the former Instituted several Gods with a particular Power, some over Wars and Battles, others over Peace; some over Diseases, Corn, Wine, Wind, Storms, Inundations, excess of Rain and Drought, &c. others over the prosperous Undertakings of Men; all derived from their intercession with *Jupiter*: And likewise as they build and dedicated Temples to each of those particular Gods, where they might exercise their Worship, to implore their Benedictions and render them propitious to their respective Undertakings; so the latter have not only set up their *Saints* (which *mutatis mutandis*, do square with the Power from, and Intercession, as they would have us believe, with the Great God of Heaven and Earth,) and Dedicated particular Temples and Chappels to each of them, as to *St. Peter*, *Sat. Paul*, *St. Antonio*, *St. Teresa*, and an abundance in sundry Towns, Villages, and Highways to *La Ma Donna*; and according to their particular Necessities they make choice of *St. Antonio di Padua*, to be cured of Blindness; of this or that *Ma Donna's* Chappel, to be supplied with a prosperous Wind in a Voyage, or to be freed of a storm of Wind, Thunder, Inundation, &c. or to be blessed with a plentiful Year of Corn and Wine, when a Famine seems to hang over

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Heads. To these several Chappels fam'd for granting this or that sort of Benediction, they resort, where by their importune deep Ejaculations, Grimaces, and Cringings, they pretend to force those Saints or *Ma Donna*, to be propitious to them in whatever they implore. Moreover, as those old *Romans* Installed such as had most exemplarily been Virrous, or Valiant, Gods and Demi-Gods, after their decease; so these Catholick ones Canonize others, that have been eminently Superstitious in their own way. Lastly, as the one by their Superstition Conquered Nations, so the other by the same means subdue Men's Estates and Lives to their Subjection. In short, upon farther examining the Parallel in all its circumstance, I do not find any extraordinary difference between the old Heathen and the modern Catholick *Romans*; wherefore I said its only *mutatis mutandis*, a Saint for a God, or Demi-God; a Chappel for a Temple, viz. an *Annunciata* for a *Templum Pacis*; some Chappels of *Madonna's*, for *Templum Cereris, Veneris, &c.*

3. Such a Prince must be Religious either really, or at least seemingly. *Qualis Rex, talis grex. Regis ad exemplum totus componitur Orbis.* A Prince is imitated by his Subjects; if the Prince neglects or contemns Religion, his Subjects soon will imitate, and consequently become Poltrons. *Cromwel* was clamber'd up to the top of this third step, and knew to frame his Actions to the least punctilio of the Religion and Schisms then in vogue, which he infused so effectually into his Soldiers, that they made little difficulty in vanquishing those, that in a great measure neglected or contemned Religion as a pedantic Thing.

4. That Prince must Tolerate but one universal Religion among all his Subjects. If the greater part of his Subjects are of one Religion, and the lesser of another, by as much as those two
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Religions are contrary to one another, by so much the greater part must be an Enemy to the lesser, and it cannot be prevented by any Law, or the strictest Edict that can be forged, and corroborated by all the Oaths and Execrations that are possible to be made, but that the greater part of such Subjects must of necessity oppress and trample upon the lesser, who in defence of themselves must either have recourse to stratagems, in slipping into great Towns in parcels, or to Ambuscades, in falling unawares upon the greater part, or to admission of Foreign Force to their assistance; by which means that Prince must always be subject to be weakned by Civil Wars. For a Prince that aspires to an Universal Monarchy, must set aside all Christianity (tho never so much pretending to Christian) and extirpate the lesser number of a contrary Religion, notwithstanding they ever proved his best Subjects) to prevent intestine Wars, Troubles, and Incumbrances, that must most certainly divert him from his grand Design. So that he cannot by far be so much decreased in strength by losing their Contribution in Aids, Taxes, or otherwise, in compelling the poorer sort of that lesser part, to follow the Religion of the greater; and, upon stubbornness, condemn 'em to Gallies and perpetual Slaveries, or turning such *Gueux* into Foreign Countreys, as he must aggrandize himself by seizing the Estates of the Richer (who are commonly more inflexible) turning them out with the others, and destroying those that remain. As for the loss of their number, he may easily supply, by encouraging the speedy increase of his remaining Subjects, in granting an Exemption from Taxes, proportionable to the number they shall get in Children by Marriage, which in twenty years must amount to a much greater number than he has lost; by which means he is secured from those

Civil Wars, and greatly strengthened by having his Subjects all of one piece, and of one Religion and Interest. 7. Such a Prince must take this for a sacred Maxim, *viz.* That the Propriety of a Crown and its Rights, doth more belong to the Successors, than the present Possessor; because there may be thousands of Successors, whereas the present Possessor is but singly one, and that possibly for a few Days, Months, or Years only, is transient, and sometimes mutable, or subject to be Deposed; as the Chronicles of most Kingdoms do report. By virtue of this Maxim it follows, that no Prince in present Possession of the Crown and its Rights, can give away, alienate, or dismember the least part of it, and consequently no manner of Renunciation of any Rights, or Claims appertaining to his Successor can in its own nature be valid; consequently also the owning, allowing, or acknowledging by a Predecessor of any Country or People, to be a free State, that ever was a Member of a Crown, can be valid to a Successor longer, than he can be in a capacity to reduce or recover it. On the other hand, this forementioned Notion seems most Erroneous and Repugnant, for as much as the present possessor, by the Law of Nations, is declared to have a greater Right than any supposed Successors; for its possible, that they by a Fundamental Law of a Kingdom, may be incapable, consequently they are *non entia*. Moreover, its repugnant to the Nature of all Treaties between one Prince and another, deprives all Publick Faith from Princes, and consequently there is no possibility left of making Agreements of Peace, or any other Stipulations between them; so that all Renunciations of Rights upon valuable Considerations, for themselves and their Successors, and acknowledgments of a People to be a free State or Kingdom, must be valid; and the more

more where their Successors, by their Silence of Claim, and continuatd acknowledgments in Treaties, do give their consent. Besides, it has been practicable and allowed by Nations, that one Prince doth and may Mortgage, or Sell, upon Conditions. part of his Country, be it a Barony, Marquisate, &c. to another for a Sum of Money; in this case not only his Publick Revenues or Tolls are sold, but the Obedience of his People, who are to swear Fealty to a new Lord. But what if he be a Papist, that will not abide by the Stipulation that was made between the People and their former Princes that were Protestants, must that People be passively Obedient, or may they refuse to swear Fealty to their new Lord, and consequently deny payment of Tolls, Taxes, or other Revenues? 8. Such a Prince must make himself absolute Sovereign over his People, by asserting that he is God Almighty's Vicegerent, or next Heir; and consequently, that all God's Power in Spirituals and Temporals is devolved upon him; so that he may set up a Patriarch at pleasure instead of an universal Bishop, turn out those vast supernumerary Legions of Priests, and Friars, who being able in Body, may be fitted for Soldiers, convertng their Revenues to his own use; likewise he must conceive, that so great a number of Women that are Cloister'd up, live idly, and require great Revenues for their support, ought to be drag'd out, to increase and multiply the number of his Subjects, and by their Labour contribute towards his vast Expences. By an Ordonnance he ought to require two Thirds of all Bulls and Indulgences to be brought into his Treasury, gradually and by length of time change and adaptate Religion to his proper advantage. In Temporals he may assume a power of exacting what Aids he thinks fit, and not judge

himself obliged by any Charters, Edicts, *Passes & Conventions* of his Predecessors, but absolutely govern by his Will and Pleasure. He ought to put his Nobility to great Expences, and by exactions upon his People, ingross all their Treasure to himself, making them universally Poor and Necessitous, to constrain them to serve in his Wars, &c. 9. It's necessary for such a Prince to seize the *West-India* Mines, being the source of Riches, and so chiefly as his most necessary step of all, to overrun the *United Provinces*, where he cannot fail to be instantly supplied with the greatest Treasure of *Europe*, in ready Cash; and, by seizing all their Shipping, makes himself, with the addition of his own Naval Force, absolute Master of the Seas, and of all Trade and Commerce. This done, he ought to turn out the Inhabitants, and make a Colony of their Country, or send another *Duc' D'Alva* among 'em, to Torture such unmannerly Hereticks to death. Now the question is, a Prince of himself being very Potent, and proving successful in this ninth step, what united Force of *Europe* can prevent him from arriving to an Universal Monarchy, especially if the *Sultan* can be prevailed with to be perfidious to his *Alcoran*, by breaking into the *German Empire*?

10. Such a Prince must have a special care not to be prodigal of the Lives of his own proper Subjects, who perhaps may be infirm in their Bodies by nature, and rendered much more so by their usual Debaucheries; for which reason he ought to gain, as much as possible, Kingdoms and States by largely Bribing and Corrupting some of the chief of their Grandees, or other leading Men; who for the present being made stone Blind with shining Gold, and for the future being assured of a Barony, Marquisate, or Dukedom, with some thousands of Crowns of Annual

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Annual Revenue annex to it, would Sacrifice their Country, Wives, Children, Relations, Friends, and Estates, in hopes of greater, to the Devil himself. It has been censured, that the cause of that great disaster that within these twenty or thirty years betwixt the two *de Witts*, was a very strong presumption that people had conceived of their having bargain'd and sold their Country to a very potent Prince. In imitation of the Republican *Romans*, he ought to accept all Princes that do not oppose him, or are apprehensive of his great Power, and willing to submit to him, as his Friends and Allies, and leave 'em in the quiet Possession of their Dominions, in the same manner as the said *Romans* did, by accepting a small Tribute as an acknowledgment, and oblige them (as the *Turk* doth his *Timars*,) to assist him upon occasion, at their own expence, with such a number of Soldiers, as they are capable to furnish

11. He ought not to keep his Word or Promise with such Traitors as had sold their Country to him, but use 'em as such, not only to deter his own Subjects from such a base Example, but to secure himself; who, as they had betray'd their own Prince, or Government, would most certainly be as ready to betray him again.

12. Such a Prince ought in his Conquest in imitation of the *Turk* intirely to lay waste, utterly ruin, and destroy as many Countries as he can, that lye remote from him, in regard he cannot spare a sufficient number of his own Subjects (who are only to be trusted) to guard them; also to render those People both noble and others, whose Country he proposes to keep and lye convenient for him (*bien seance*) as miserably poor as he can, trample upon, and make them Slaves *More Romano*. He ought previously to render his Language and fashion universal among Foreign Nations,

and to distribute some of the dregs of his slavish Subjects to be their Servitors, to teach 'em to tie up their Whigs, cultivate and inamour them with their fashions and Language (which well considered) is the most basartized, and improper in the World) that in their turns they may become the same Slaves to the Conquerors. In short, not to trifle away more time, the History of the *Grecians, Romans, and Turks*, will abundantly supply Examples and Directions for such a Prince. But supposing all these recited Miseries may reasonably be suspected to hang over the heads of most Protestant and Catholick princes, Estates and Circles that, for a very few Years may enjoy their quiet by a foolish Neutrality, designing thereby to save their Purses, and increase their Trade; when its too late, into what Consternations, anguors, and despairs, must they be put into, when the Conquerour comes to devour 'em all in a minute, and make 'em perpetual Slaves? A small inconsiderable Cottage being in Fire two or three Streets off, the remoter Inhabitants slight this little Blaze as being possible to be puffed out, until coming very near, and then what an hurry, terrour, and agony are they plunged into by their foolish Neutrality, or negligence, and inhuman barbarous Denial of their Assistance in easily extinguishing that first little spark of Fire; (*principiis obsta*, (whereas now they offer one half, or three fourths to Kennel Rakers that will come in to help 'em to save only t'other half, or one fourth.

12 The burning of the Ships at *Chat.* at first was look'd upon as a jest, when afterwards it was apprehended to threaten greater danger; what a bustle, senseless running, hurrying and despair was there? I do believe for an Hundred Pounds in ready Money one might at that time have purchased of some over timorous Fools an Hundred Pounds *per Annum*.

31. Thus

13. Thus far obiter. To proceed: Having by continued Acts of Virtue obtained an habit, whereby to arrive to a *Bonum Particulare*, and a *Bonum Universale* or *Publicum*, you are at last to be recompensed with a *Summum Bonum*, and the greatest happiness, which consists only in a Contemplative Life, in no wise implying a dumb, stupid, and fixt extatic gazing or staring at a single Picture, or Object, like to a senseless Quietist, or a foolish Quaker, but a practical contemplation of all things both humane, and especially Divine, of their Rise, Continuation, Causes, and Affections, wherein the Soul of Man, and her noblest faculties are entertained, with the greatest pleasure, satisfaction, and sedateness from all molestation or disturbance. The Instances of the most virtuous Romans, as *Cato*, *Cicero*, and many others, are a plain proof hereof, who environ'd with all the pleasures that Riches, Honour, or health, were capable to afford them, yet as oft as occasion presented, would steal themselves from 'em to retirements, where they might enjoy the highest pleasures contemplation is ever attended with. *Brutus* (the murder of *Caesar* excepted) was in his time reputed one of the most virtuous of Men; he as zealous as he was for the Publick good, made contemplation his *Summum Bonum*, even to the slighting all other pleasures, and the most eminent of dangers; for the Night before the *Philippian* Battle, which might be thought he would have spent in preparing his Affairs, yet chose to pass it in contemplation of *Philosophic* matters, wherein it was not possible for the *Phantome*, that address'd himself to him to disturb him, with saying he would meet him to morrow in the *Philippian* Camp; *Brutus* making no other Answer but, *Then we shall meet*.

14. If we descend to Modern times, we shall find the *Summum Bonum* consisteth only in a
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contemplative Life, by the examples and practice of many of our great Divines, and Lawyers, Wirnells, my Lord Bacon, Judge Hale, and abundance of others of Eminent Virtue, who withdrew themselves to enjoy a Contemplative Life.

C H A P. IV.

Of the Digestion and Indigestion in the Stomach, and the Vanity of the Causes thereof.

1. **I**T might be reasonably expected from the tradition of so many Ages, and the Studies of six or twelve Months of so many *Masters of Arts*, of seven Years standing or walking up and down the Streets, and University Meadows, before they assume the tufted Gown, that *Galen's* Theory would be render'd as *Diaphanous*, and demonstrable as *Euclid*; yet to my dimoculation, many, if not most of their Notions, seem still to be plunged in a dark *Chaos*; for as obvious as the digestion of the Food in the Stomach may be, though it be the first operation in the Body of Man, and therefore ought to be better understood, yet to me seems now, nothing can be worse explained, than by asserting the Diffolution into Chyle to be performed by the natural and adventitious heat of the Stomach, brought to it by the Arteries and warm coverings of the Liver, Spleen, and other adjacents. A *Sharck*, *Sea-Wolf*, and other Fish, if Credit may be given to all those Writers of *India* Voyages, have been found to contain in their Bellies a whole Man, being thrown overboard, with all his Cloaths upon him, great Joynts of stinking Beef, with their huge Ox Bones in them, and Carcasses of Sheep with their Wool on their Back, all which were discerned almost digested into a thick slimy Juice, without observing any sensible heat, but rather coldness.

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The like may in proportion be instanced in a fresh water *Sharc*, I mean the *Pike*, whose vigour in digesting an Ox Paunch, and other Garbage, likewise Boney Fish of considerable bigness, without any sensible heat in his Bowels, or any steaming warmth. is an Argument that inforceth the former. The heat in the Maws of *Poultrey*, which is inferiour to that of the Stomach of a Man, cannot be conceived in any wise proportionable to dissolve the husks of *Barley* or *Oats*, (which notwithstanding they perfectly digest to an exact smoothness) and especially small Pebbles, which the extremity of Fire may melt, but not dissolve, and yet the heat of the Stomach of a Horse, though much more intense, doth make much less impression upon Grain, which commonly slip away untouched with their Dung. It hath likewise been decided by common Observation, that those who heat their Stomach at Meals with Wine, or soon after with Brandy, have a more difficult Digestion than others, who moisten their Victuals with small Beer, Wine diluted with Water, or only Water, as is usual to three fourths of the Universe.

2. Most Esculents seem to me to contain some Gummous Juice in them, that tieth their parts together, which Water will readily dissolve, and Wine, or the Spirits of Wine do harden. This Gummous clammy juice being dissolved, the parts which it cemented and kept together must necessarily fall asunder into a sort of Batter. But where the parts of Alimentary substance are cemented together by a resinous Juice, then most certainly Wine or its Spirits would more readily dissolve them, and Water would harden them.

3. Fish is apt to be hardened in the Stomach by drinking Wine upon it, and consequently is longer in its Dissolution, as appears in many that are sick at their

their Stomach, or very uneasy and heavy in the Digestion of it; whereas those that drink only small Beer, or Wine and Water upon it, digest it very easily. In the Northern Parts, as *Holland, Zealand,* and Maritime parts of *Germany*, where People do very much sustain themselves by eating Fish; they generally drink very small Beer upon it, and notwithstanding digesting it easily, grow strong, and impinguate. Likewise its observed, that Fish that's Boil'd with Wine and Water, as some do out of Luxury, is hardned, which rendring it more solid and fibrous, gives the gustative part of the Mouth the more delight in the chawing it, though greater labour to the Stomach to digest it; whereas being Boil'd in Water, becomes soft, and more easily digestible. But Wine drunk two hours after, doth much promote the fermentation, (that as I said before arrives towards the latter end of digestion) and distribution of the Chyle through the alimentary or milky Vessels. After all, I do know, that use and custom doth much prevail in that part; and therefore those that are from an ill Custom used to drink Wine upon Fish, are apt to be sickish without it, tho' with it they are much longer in digesting of it than Flesh Meat.

4. Fish seems to contain a very strong gummy Juice, a strong Glue, (*ichthyocolle*) being made out of it, and therefore is much more easily dissolvable or digestible by Water, or watery Liquors, than by Wine, or other strong Drink.

5. Neither am I convinced, that those who ascribe the Energy of Concoction to an Acid Ferment, have in any wise hit their Mark; for considering fermentation imports properly an insensible, and in some things a sensible small ebullition or simmering of any natural, or artificial, mixt, or compounded liquid, soft, or consistent Body, which by rarefaction, or widening

ing and opening the pores in the close parts, doth let out, or expel such Particles or Bodies, that are Heterogeneous, whereby a depuration of the said mixt body is attained: And if this rarefaction, or widening, and multiplying of the pores of the Body be protracted to too long a continuance, or performed with too great violence, the most subtil particles of that body, which are the chief constituents of it, are forced, or let out together with the Heterogeneous, whereupon a dissolution, putrefaction and corruption of the whole mixture must necessarily ensue, as appears in the fermentation of Wine, Beer Cider, &c. which being rais'd too high, or continued too long, doth most certainly convert them into Vinegar. Dow by yist or levain is huff up, (or in the common phrase doth rise) or rarefied, that is opened, or widened in all its pores and oft multiplied whereby the most subtil particles, or matter of the fire (being the heat of the Oven) is let in, which together with the constituent most subtil particles of the Dow, do expel the nitrous, and other heterogenous slymy parts, that otherwise would prove very offensive to the stomach, and in some be rendr'd indigestible. Now if the Dow continue too long in rising, or rise too fast, it soon falls, and is apt to turn Sour, and being then put into the Oven, can never be well baked, and doth in a short time turn mouldy.

6. To say then, that Bones, Grissels, or any other hard matter, is rarefying in a Dog's stomach, meaning thereby fermenting and consequently digesting, to me seems a very improper way of speaking; for Fermentation doth in my Opinion ever follow Solution, in order to depurate and render homogeneous, what is dissolved; how then can those Bones be said to be fermenting

fermenting, before they are dissolved and digested?

7. It is to the Spittle many Physicians of good Fame do attribute the chief, or rather sole power of dissolving the Victuals into Chyle; by raising a Fermentation in the Meat and Drink, that's swallowed down into the Stomach; for being chewed, crush'd, rowl'd and turn'd about in the Mouth, it's mixed with such a proportion of Spittle, which by its Spirits and Saline Particles, assisted somewhat by the native and ambient heat of the Stomach, penetrating through the pores of the Victuals, raises a sort of a small ebullition, whereby they are dissolved. But if you consider the nature and use of Spittle, probably this matter may appear otherwise to you. Spittle cannot properly be called an Excrement, which is of no use, and ought to be thrown out and expelled; but a Recrement, which is of use, and ought not to be expelled, unless it be abounding, and after it hath performed what is intended for. *Horses, Cows,* and other Animals have their Mouths and Throats always moistned with Spittle, but which is seldom or never expelled by them by sputation, as very oft it is by the Humane kind, when it become superfluous; which is an Argument, it's no Excrement. The use of it to me appears, to moisten the several parts of the Mouth, Gullet, and Windpipe, and to keep them Constantly glib, smooth and soft; for otherwise the Tongue and Jaws by their frequent motion, and the steems that continually pass out of the Lungs in the expiration, would render those parts so dry, stiff, rough and unpliable, that they would become useless. The Windpipe would be so corrugated and contracted, that it would put a stop to the respiration; the Gullet would likewise through want of Spittle suffer

be such a streightning and roughness, that it would be utterly incapable to give passage to the Victuals. Touching the nature of Spittle, it is in no wise different from *Lympha*, which is contained in other *Lympha-Ductus*, the *Ductus Salivales* being no other, and as long as it continues in the said *Ductus*, its much fuller of volatil saline Spirits, which renders it limpid, fluid, and thin; but being come to the Mouth and the other parts, out of the said *Ductus*, those volatil saline Spirits do soon evaporare, and fly away, whereby the Spittle becomes thick, mucilaginous, and oft frothy, by the admixture of extraneous Air, and other slimy Particles, it meets about the Mouth and Throat. So that if Spittle be of this nature, it must rather hinder Fermentation, and consequently the pretended Solution into Chyle, which that it doth, is manifest in those Melancholians, that are commonly termed Spitters, who generally have a very bad Digestion, But suppose a Man that abounds with Spittle, should spit a quantity of it warm out of his Mouth into a warm bolt head hermetically closed, containing a small bit of Meat that had been well grinded in a warm Mortar, and then this mixture being put into a warm Sand Bath, do you believe, here would happen either a Fermentation, Ebullition, or Solution into Chyle, though it were to continue there six Weeks? Or, suppose a Man should swallow several great lumps of Flesh, without chawing of it, or mixing it with his Spittle, do you not think he would digest into a Chyle, though it might take up some longer time, than if his Meat was chawed? What Spittle doth a *Sparc* or *Pike* mix with those great pieces of Flesh and Bones, which they swallow without chawing, and yet digest them sooner than any

other

other Creature could, as they are in the Water.
 8. That the *Lympha* in all the *Lympha-ducts* (and the Spittle also though more sparingly) is perfused with some remaining proportion of volatil saline (that is Animal) Spirits, appears to me by the similitude of Argument, for establishing the circulation of the Blood out of the Arteries into the Veins, and thence into the Arteries again. The chief Motive to me being, that the Heart throwing at every Pulsation such proportions of Blood into the Arteries; these must of necessity swell to an extremity and burst, were there not other Vessels, namely, the Veins, ready to receive and unload the Arteries; as for the swelling of the Arteries on the side towards the Trunc, and of the Veins towards the Extremities of the Body, upon a Ligature made on any of the Joints; or the Arterial Blood upon Arteriotomy flowing from the Trunc, and the Venal Blood upon Phlebotomy flowing towards the Trunc, would scarce be persuasive enough to me to receive that Doctrine, since other Reasons might be given for those different Intumescencies upon a Ligature, or the different issuings out of the Blood out of the Arteries and Veins. In like manner I do suppose, that the *Nervous Lympha*, which is the Vehicle, and containing Liquor of the Animal Spirits, is always flowing or dripping from the Brain, and *Medulla Spinalis* to most parts of the Body through the Nerves; and cannot be supposed to return back again naturally, which therefore must of necessity extreamly swell, and stiffen the Nerves, unless received and disburden'd by some other Vessels, which in all probability must be the *Lympha-ducts*, containing in substance, tenuity, clearness, penetrative vertue, and other qualities a *Lympha* not unlike the Gleet, that distills from

a Wounded Nerve. Moreover considering the valves in the said *Lymphaducts*, opening towards the Trunc, and shutting towards the Extremities, doth add to the apparency of the fore-mentioned supposition, implying there is a circulation of the Animal Spirits and *Lympha*. The foresaid *Lympha* being received by the *Lymphaducts*, must necessarily be much impoverish'd in its volatil saline Spirits, and consequently have lost its power of apporporting of motion and sense, (though otherwise of very great use,) almost in the same proportion, as the Blood in the Veins hath lost of motion, and is very considerably retarded, in respect of the quick and rapid motion of the Blood in the Arteries.

9. Neither can I conceive, that the Stomach is capable to contain any Acid Juice powerful enough to dissolve Bones, Grissels, Sinews, Skin, and all sorts of Flesh without hurt, and danger of perforating its Membrane, the latter being much softer and easier to be dissolved, than Bones or Sinews: If you pour the strongest Vinegar, or *Aqua fortis* upon those Edibles beforementioned, and set them over any degree of Fire in a Vessel, stop'd as close as if Hermetically Sealed, for the space of ten or twelve Hours, you will scarce find any Solution, or at least not comparable, to what a sound Stomach performs in two or three Hours. Moreover, where any Person by fowre Belches perceives his Stomach to be charged with a fowre Juice, his Victuals will scarce be digested, or dissolved into a good Chyle, but into that sort of slime, which Physicians term *Cru-ditas acida*. And I have frequently observed, that many upon Drinking fower Beer, or eager Wines, or using fower Sauces to their Victuals, have not only undergone a very laborious and painful Digestion, but oft-times been forced to throw up their whole Cargo.

10. The Stomach doth sometimes receive such sorts of Aliment, as Pudding, pancake, Custard, Tansie, Minced Pie, Plum Broath, Plum-Cakes, and the like, which in most Persons will ferment, and be rarefied to a degree, that will huff up, distend, and swell not only the Region of the Stomach and Hypochonders, but also their whole Belly, to an extension and uneasiness, that will oblige them to unbutton, and widen their waistband. Those recited, and the like Edibles, containing a Fermentative Spirit in them, seldom fail in fermenting, during which, as it suspends, or at least retards the Concoction, (notwithstanding they seem matters so easily digestible, and incomparatively less difficult than Beef, Pork, &c.) yet the solution cannot, or is seldom perform'd with vigour, until the foresaid fermentation ceases, which is perceived by the Subsiding and relaxing of their drum Bellies. Hence it is, that many do find, they cannot digest so easily upon drinking bitter or sower Small beer, or strong Ale, Beer, or Wine, as a small Alish smooth Beer, Water, or Wine and Water, because the former contain such a large proportion of fermentative Spirits. And it is upon the same consideration, that new Drink not being sufficiently cleared of its Yist, and other Feculencies, proves so offensive to Digestion; Besides, strong Beer, Wine, and Brandy, also all sower Drinks do harden the Victuals in the Stomach, which Water and small Drinks soften and dissolve, as you may read, together with the Reason thereof, in the Second Paragraph of this Chapter. Nevertheless, to some Constitutions that are slabby, cold and moist, and accustomed to strong Drinks, these may be much more agreeable.

11. Since I can in no wise apprehend the dissolution of Victuals in the Stomach to be
caused

caused by Heat, Fermentation, or any corroding acid Juice, no more than Gold, which the extremity of heat will melt, and not dissolve, nor will a strong corroding *Aqua Fortis* touch it, yet a small proportion of fluid *Mercury*, (which in that form hath no manner of a corrosive sharpness in it) with the assistance of a very little warmth, doth in a short interval of time very expeditiously and potently, by its most subtil Particles insinuating into its Pores, though more close than in any Body whatsoever besides it self, rare it asunder, dissolve, and divide it into the minutest Particles. In the same manner, I do conceive, that all sorts of Victuals, be they hard or soft, are as easily and readily digested in strong and sound Constitutions, by the most subtil saline Particles of the Body, (which are the Animal Spirits) steaming in clouds out of those large Nerves of the sixth pair, that are inserted into the Stomach, and their numerous branches that are disseminated thro its (supposed) Tunics, which forcing into the Pores of the alimentary Substances, rare them asunder, divide, and dissolve them into the minutest Particles, and being mixt with the moisture of your Drink (especially small Drink contributing much to the Solution of the gummous matter, that very probably is contained in most sorts of Edibles, as hath been hinted before) are converted into that Juice we call Chyle: Hereunto the warmth of the Stomach derived from the Arteries, and cirrounding Bowels is very assistent, though it hath been oft observed, that some whose Stomach hath been commonly felt very cold by themselves, yet nevertheless had a very potent digestive faculty, that would subdue the hardest and rawest of Meats.

12. *Digestio* (the doing any thing a sunder)
Solutio (the untying the bindings of things) *Cor-*

ruptio in a large acception (the breaking of the texture, *nexus*, temperament and mixture of Bodies) are all words *synonyma*, to express the manner of the confection of the Chyle, by doing in sunder, untying of the bindings, and breaking of the texture, *nexus*, temperament and mixture of Victuals in the Stomach, (and by the *Cartesians* termed a change either partial or total of the position of the Particles,) all which is performed by most subtil particles entering the pores of the Victuals, widening and tearing them sunder, by which the filaments or *stamina* are broken, which most subtil Particles are the Animal Spirits, that consist out of the most Aereal Particles of the Blood, united with the most subtil saline Particles thereof, and afterwards knitted together, and strain'd through the most minute pores of the Brain into a thin Limpid Oily *Lympha*, as the Gleet from the Nerves doth plainly shew it self to be both to the Sight and Touch; but of the constitution of Animal Spirits, more will be said in another place.

12. The Colour of Chyle is commonly of a greyish white, occasioned by the rarefaction of its body into wide pores, which being adapted to admit the light from without copiously to a great depth, makes it appear of a whitish colour; whereas the density of a Body disposeth it to blackness, by excluding the luminous particles in the Surface. The Objection that Gold ought to appear black, because its Body is the most condensed of any, is easily answered, by supposing, That if its Body were absolutely condensed, it must be black; but granting also that it must be indued with some pores to admit a proportion of luminous rays, which I will only suppose to be extreemly white, and white in some proportion added to black, renders a yellow, and if equal, in many things makes

makes a red: But observe, that part of this Paragraph is only a *Supplementum*.

13. Now when the inward coat of the Stomach (*Panica rugosa*) is cover'd with too much slime, (for its necessary it should be cover'd with a little, to defend it from the sharpness and roughness of all sorts of Victuals it receives) so as to stop and plaister up the pores of the Nerves, whereby the foresaid most subtil filine Particles are in some proportion hindered from flying out, the digestion becomes slow, laborious, painful, and difficult, concocting a slimy Chyle, which in process of time doth turn into many sorts of Diseases.

14. Of those that drink thick, austere, or adstringent Wines, at, or soon after Meals, or close their Repast with Quince-Marmelade, Chestnuts, Almonds, or the like, I have experimentally found, that in many, to whom either the lessening the use, or wholly weaning themselves from those Things, hath been advised, their digestion hath been soon reduced to its former Vigour, which before, by the continual closing of the Pores of the Stomach-Nerves; was exceedingly debilitated, by the foresaid clogging, and adstringent things.

15. It is likewise as consonant to experience, that those who usually drink any Wines, not being diluted with Water, or that commonly conclude their Dinners or Suppers with Banquets of Sweet-meats, Custards, Cheescakes, Creams, and Gellies, do weaken and in time destroy their Concoction, so as few of them are found to be long livers; bycause those before-mentioned materials containing a fermentative Juice, by raising a Fermentation, do extreemly interrupt and impede the dissolution of Aliments in their Stomach. Those Fermentations in the Stomach, upon Fermentative Edibles, are frequently cau-

les, that produce those flushings in the Face soon after Meals, and at other times in many Women, and some Men, that have weak Digestions, and contain something in their Stomachs that is Fermentable, against which drinking of Water, or Water mixt with very little Wine, hath oft proved an effectual Remedy.

16. Some that have for several Years been afflicted after Meals with pain and disturbances in their Heads, drowiness, uneasiness in their Limbs, faintnesses, belches, huffings up, and tensions in their Hypochonders and Bellies, have been totally cured of all their turbulent Symptoms, by throwing off all Malt-drinks, and Wine, and gradually using themselves to drink Water, when all other Remedies were so far from giving them relief, that they rather aggravated their Complaints. But what is more, it hath been observed, that Chronical Coughs of many Years continuance have been not only removed, but perfectly cured, by exchanging of Malt-drinks and Wine into Water, or into Water refresh'd with a little Wine. And those that have travell'd through *Germany*, and the *Low Countries*, might have observed, that the strongest and healthfulest Bodies are found among the Boors, who for their ordinary Drink are scarce acquainted with any thing but Whey, or clear Water, which contributing so much to perfection of Digestion, may very reasonably be esteemed the true cause of their Health, Vigour, and long Life. These and many more like instances do force this concession from me, that the choice of Drinks is of greater importance than of Edibles. When Fermentative Drinks, as strong Beer, and Wine, shall disturb and retard Digestion, and cold Water which suppresses Fermentations (as appears in many Hysterick Women, that by drinking a Glass of fair Water, do

do in a moment turn off a fit) shall in many promote and enliven Digestion, how can it then be thought, that Digestion is caused by the heat of the Stomach, or by Fermentation?

to 18. Though drinking Water hath on several occasions proved successful to admiration, yet particular regard must be had to the Climate, season of the Year, Age, Sex, Custom, and other Circumstances; for should drinking Water be recommended to one, who from his Infancy hath been used to small Beer and living in a Northern cold Climate, in a rough freezing season, and of a tender Constitution, very unhappy consequences must be expected from such unadvisedness. Wherefore, where change of Drink shall be judged necessary, from the continual use of strong Beer, or Wine, you may descend to small Beer, Barley-Water, clarified Whey, a weak Mead, thin Grewel, or the like, in Winter; and to some others to Spring Water in the Spring and Summer, which may prove yet safer upon premising some small Bleeding in repleat Bodies, and gentle laxatives in foul and depraved Constitutions.

C H A P. V.

*Of Hunger and Thirst, and their Causes:
Also of the Vanity of Opinions concern-
ing them.*

1. **T**HAT Hunger is an Appetite for edible Food, and Thirst for potable, is received by all Men in general, and particularly by Physicians; but the Causes by which, and manner how, both, or either of them are excited, is so oddly expressed by *Sennertus*, and others before him, that it would be a wonder to me, how such vain Opinions have never been censured by those multitudes of Learned Men since, were it not, that they found too much difficulty in amending those Explanations of Hunger, and Thirst, *viz.* that both happen by reason, that when the parts of the Body are wasted, grow dry and shrinking, they draw from the lesser Vessels, and those from the greater, and these again by Succession from others, that immediately draw from the Stomach.

2. How this seems to contradict all sorts of *Philosophy*, and the Modern Doctrine of *Anatomy*, will easily be explain'd to you. The parts that are to be nourish'd, are either Sanguin or Spermatic, the former being so called, because they were originally constituted out of the Blood, and the latter out of the Geniture, which is pretty hard to apprehend. In regard, that parts are to be preserved, nourish'd and augmented by the same substance, of which they do consist, and consequently the sanguin parts are only nourish'd

nourish with Blood, and the others with a spermatick Juice, which they say, they severally suck out of the lesser Vessels and these out of the others, until the suction reaches the Stomach. But should you allow this suction in soft parts, whose Orifices are flexible, in what manner can the solid and spermatic Parts, as Bones, Grissels, &c. be conceived to suck, when they are hungry? The Moderns are much more in the right, in not allowing any suction within the Body, and explaining most sorts of motions in the Body to be by Pulsion and Protrusion.

3. This emptiness of all the Vessels of the Body successively, until it also reaches the Vessels of the Stomach, seems to be a remote cause of Hunger, the effect or consequence of which emptiness is an Universal weakness, faintness or languidness of all the parts; but this cannot be Hunger, which is a painful sensation of the nervous membrane of the Stomach, and thence Hunger is termed sharp, or an exquisite gnawing sharp pain, which can happen to no other part, than what is nervous, that being only susceptible of pain. That it is so, appears by the taking of any sort of opiate or narcotic Medicine, which doth immediately take off Hunger, because it takes off pain; and by filling the Stomach, wholly or partly, with Victuals, which no sooner are swallowed down, but become glutinous and roapy, that is to say, raucilaginous, by their *Lentor* and *mucus* smoothing the roughness of the nervous Tunic, and consequently abating the pain; so that the fuller the Stomach is of gross and heavy Food, or light sweetned distending and fermenting Meats, the sooner Hunger is removed, by distending the Membrane of the Stomach, through its weight and quantity of the former, whereby the corrugation and roughness of the
said

said Membrane is removed, and by the mucilaginous quality of the latter smoothed. Purging Physick removes Hunger, by oppressing diverting, and imploying the Animal Spirits another way, so as that during the working of the Medicine they, (*viz.* Animal Spirits,) are hindered from causing a roughness and pain in the Stomach, pain being occasioned by the violent disuniting and tearing asunder of the said Animal Spirits in the nervous parts. Sleep removes Hunger, by no other ways and means, than by locking up the Animal Spirits, and detaining them from acting upon the Stomach.

4. A further and to me convincing Argument, that Hunger cannot be occasioned immediately by emptiness of the Vessels, continued down to the Stomach, and by their Mouths, or Orifices pulling, halling, raking, and sucking the Tets (if I may so say) of the Stomach, is, that Hunger upon that supposition cannot be removed suddenly, and all at once, but must be two or three hours, before any Chyle, or chyliferous Milk can be made ready for the Pores and Vessels to suck and abate their Hunger; and in regard the Vessels are to suck, until they are moderately filled and satisfied, it must be Six or Eight Hours before Hunger can be gone off.

5. Thirst seems likewise to be an affection of the Stomach, but different from that, which occasions Hunger; bycause its possible, for a Man to be hungry, and not to have thirst, as it is common, for a Man to be thirsty, and not hungry, and as common to be hungry and thirsty together. The sensation of pain is either blunter, or sharper; the former is occasioned by a slighter affection upon the grosser Nerves, and nervous parts; whereas the latter is an affection more penetrating, acute, sharp, and reaching the subtilest, deepest, and finest fibres, of the Nerves, that

that are disseminated through the thickness of the Stomach. Now, I do conceive, Hunger to happen by the affection of the grosser nervous parts, and thirst by affection of the subtiler; for beyond all contradiction thirst is abundantly more insupportable than hunger, and doth very oft in hot Countries, by bringing great Lypothymies upon Men, kill 'em in a very short time, whereas Hunger is many days in reducing one to the last Extremity.

6. The only Remedy, where there is want of Victuals and Water, (as it hath oft happened in long Voyages,) to assuage Hunger and Thirst, is to be provided with some Opiates to blunt the pains of the Stomach, and taking such a proportion only, as will moderately stupefy, and not cast one into a deep sleep, which must be repeated, as oft as the Medicine hath exerted all its power. Besides Opiates by stupefying (if I may so term it) doth retard the Animal Spirits exceedingly in ravaging and consuming the Juices, and all the parts of the Body, as it appears by many Animals, that sleep over (if it be true, what is affirmed by several Authors) a great part of the Winter, and yet at their awaking, they are not very much emaciated, as the distich upon the Field Mouse seems to express.

*Tota mihi dormitur hyems, & pinguior illo
Tempore sum, quo me ni'l nisi somnus alit.*

7. In a canine Appetite, though Hippocrates recommends in his Aphorism drinking of strong Wines not diluted, yet its most certain, that opiates moderately joined with other Ingredients, will much more speedily, and effectually abate, and remove that Distemper

8. Tabacco is accounted by most narcotic, and therefore may well be stiled an *Indian Henbane*, and it is by that vertue it suppresses Hunger, though probably those that swallow some
part

Part of their Spittle in the taking of it, abate their Hunger more effectually, by its mucilaginous Quality, smoothing the roughness of the nervous membranes of the Stomach. Upon the same reason it is, that Soldiers in a march do chew a Bullet: which by frequent moving of the Jaw and Tongue doth attenuate the *Lympha* in the *ductus salivales*, and also opens them, whereby abundance of mucilaginous and frothy Spittle is let out, which being swallowed into the Stomach, doth by its Lentour smooth and ease that roughness. Not that Spittle is in any wise nutritive, as some do attribute its power of ceasing of Hunger to; that for being a meer recrement, its wholly divested of any such property.

9. Our next business is to enquire, from whence proceeds, or what is the cause of that pain in the Stomach in Hunger, and Thirst. It is not emptiness, or the suction of empty Vessels; for many that have been render'd empty by purging, bleeding, and long Diseases, must be accounted ten times more empty, then three or four hours fasting amounts to, and yet in the former cases they oft are free from the least sense of Hungry pain, which in the latter is otherwise. The cause of Hunger and Thirst, as I do apprehend, is in the Animal Spirits in the Nerves, which being fluid and dispersed every where throughout the Body, do by their motion not only consume themselves, and diminish the alimentary Juices, but also shrink the parts themselves. Consider then, that the Animal Spirits are most subtil fluid Particles, floating mixt and perfused throughout the nervous saline Liquour, which imagine only to be a nitrous Salt turn'd into fluid *per deliquium*. 2d. That according to the nature of Nitre, it is perfused with very numerous tenacious tough and extensible pores, filled, cram'd and rarefied with Animal Spirits,

rits, which upon breaking forth with an Elastic motion are render'd most potent and capable to perform the most impetuous and forcible effects, that can be perform'd by humane joints and their Muscles. Now applying, what I have in the preceding Philosophy express'd concerning rarefaction, to the Animal Spirits in the Brain, you may very easily conceive, how all the voluntary and natural motions are performed in the Body, and that by length of time, and continuance of motion they are not only consumed themselves, but have also wasted the thinner fluid parts of the *Lympha*, which being now become more rough, saline and as it were corroding for want of moisture, do vellicate and gnaw the grosser nervous parts of the Stomach, and so occasion the painful sense of Hunger, and the less gross saline particles being also acid, through want of moisture, and Spirits, piercing deeper into the subtiler nervous parts of the Stomach, chiefly and in a great measure, cause the sense of Thirst. In conformity to this Discourse its found, that sour things create an Appetite to solid Food, because they cause a roughness upon the supposed tunics of the Stomach, and vellicate the nervous parts thereof; on the contrary sweet things, fat Meats, and Oyl by smoothing the sides of the Stomach, diminish Hunger. On the other hand, sour Drinks soonest abate Thirst, and sweet Drinks increase it; because the former by their sour particles open more readily the pores of the tunics of the Stomach, and convey the moisture to those deeper fibres of the Nerves, whereas sweet Drinks by glewiness stop the foresaid pores, and hinder the moisture in their passage. But in regard there are Nerves dispersed all the Body over, and thro' several Membranes, these cannot be so sensible of an Hungry pain, as the Stomach, which is perfused with more Animal Spirits (that are always

ways in action) and Nervous *Lympha*, and hath a more large distribution of greater and lesser Nerves, and consequently more sensible, than any other part of the Body, as those can best testify, that have felt such acute exquisite pains in their Stomach, as have occasioned Convulsions.

10. There is also another cause of Hunger to be taken notice of, which is the four Liquor, that usually remains in the Stomach after every Digestion and evacuation of Chyle is performed. This four Liquor being in too great a proportion, as also four steam, do oft cause a False Appetite.

11. That common Salt and Salt Meat should, cause so excessive a drought, as they do, is not, bycause Salt doth absorb moisture; on the contrary it rather increases any moisture in weight and extent, neither can it be supposed, that a Thimbleful of Salt should absorb so much moisture, as to occasion it to be supplied, by drinking a Quart or two of Small-beer. The true reason is, bycause Salt, being of a rough nature, and being dissolved in the Liquor floating in the Stomach, pierceth immediately to the deepest parts of those subtil Nerves, and there occasions that roughness in the profundity of the Membrane.

12. I would here observe, that in the Explanation, which I have made of the different seat, and causes of Hunger and Thirst, by ascribing the former to the roughness of saline *Lympha*, in the grosser Nerves, and their grosser Threds, that are dispersed through the inward parts of the Stomach, and consequently nearest to the capacity, and of a Sense not so exquisite, as the middle parts, the Nerves whereof I did describe to be deeper, as more remote from the hollow of the Stomach, and of much finer texture,

I did rather chuse to explicate this matter in that manner, than to assert, that the seat of Hunger is in the inward coat, and that of Thirst in the middle coat of the Stomach, as if the Stomach was in it self to be divided in so many parts, as Anatomists make Tunics, whilst it is in the Body yet living. I take this matter to be otherwise, apprehending the Stomach to be one intire thick membrane or Skin in the Body living, the tunics or parts of it being so closely cemented together, and exactly united by the transcurrency of so very numerous a Train of all sorts of Vessels, that I much question, whether any part of all the Body can by far equal it for numbers of Nerves, Arteries, Veins *Lymphæ-Ducts*, &c. True it is, the Stomach being taken out of a dead Body, and so dried, that the transcurent Vessels are shrunk into the least Filaments, and the cementing glutinous matter consumed, it is easy enough to tare the Stomach not only into three coats, but into three and twenty, so that I do own my self in an Error, to have given credit to the common assignment of the causes of some Diseases of the Stomach to flegm, impacted between the Tunics of the Stomach, though it doth not seldom happen, that in those cases glutinous gross flegm is so impacted between the folds of the *tunica rugosa*, that its scarce in the power of two or three Vomits to pull it from thence. Moreover the Stomach in a living Body consisting of a very thick coat (as I have described before) pierced with innumerable Orifices, is capable in a manner of a Sponge to imbibe a vast quantity of flegm, so as greatly to swell it, which then doth suppress Hunger, and Thirst also, unless it be saline, or putrefy.

12. In the foregoing part of this Discourse, I expressed, how chiefly, and for the greater part, Thirst

was

was occasioned, having reserved the explanation of another cause (though accidental) to this Paragraph. It is generally observed, that upon much Sweating, and making large quantities of Urin, a Man is apt to be very drougthy, occasioned by the large expence of the *Lympha* in the *Lympha-Ducts* in the circumferential parts, which necessarily must drain all the other *Lympha-Ducts*, as far as the Stomach, and these consequently receive it from the Nerves, which then must occasion a sudden Thirst, that is as suddenly removed by large draughts of moisture; but how all the parts come to be so suddenly moistned again as they are, seems to be not easy to be explain'd; for it is supposed, that the Drink, that's largely swallowed down, being to pass through the Guts, and chyliferous passages, it must be some Hours, before it can make its room through the Arteries, Heart, and Lungs, to arrive to the parts, that are so dried. To obviate this difficulty, I cannot apprehend any other means or ways, than what I am setting down.

14. The thick Membrane, or (in the vulgar acceptation) Membranes of the Stomach being intersperst with many more numerous *Lympha-Ducts*, than any other part of the Body, as will easily appear by the Experiment I shall insert hereafter, and their minute Orifices terminating into the inward surface of the said thick Membrane of the Stomach, are as oft forced open, as there is an extraordinary occasion, by the abounding moisture of the Stomach, propelled into them by the Animal Spirits, that are persused through the Contents of the Stomach (according to what I have explain'd in another preceding Chapter) and thence speedily protruded to the parts of the Body beforementioned, that are to be moistned. That this is so, is apparent to me, in those that drink quantities of Mineral

Mineral Diuretic Waters, be they vitriolat, chalybeat, or sulphurous, these in some passing to the Kidneys and Bladder in a very little more time, than they are in drinking of them, and much less time than you can suppose them to have reacht half way the long meander of the Guts, to be thence pumpt up by the chyloferous passages, be they never so many, and afterwards to pass through such a number of remote Arteries and Bowels, and descend down again to be percolated through those minute chanals of the Kidneys. I do know, that a famous Author to make his marks to bear, so as to give so speedy a passage to the said Mineral Waters, was constrained, to allow the Blood in the circulation such a wonderful swift carrier, as you cannot imagine Water to run faster out of a Barrel at the Bung-hole; so that I can never conceive the Water to pass that way, since by what I have remarkt in some of these Papers, I am convinced the motion of the Blood in the circulation is incomparatively slower, than what the foresaid Author would have his Reader believe. There is another very remarkable Instance in some hysterick Women, who to prevent an approaching Fit, have drunk a good large Draught of fair Water, which in a Minute or little longer hath been return'd at the Bladder, not in the least altered in Colour, Smell, Taste, or Consistency; what is more, some of that Sex having a good Talent in drinking of white Wine, have in much less time, than can be allowed to circulate round the Veins, and Arteries, render'd back the Wine in a Chamber Pot, not in any sensible manner much different from the vinous Taste, Smell, and Colour.

14. For Persons under some Diseases to make a thin Water colour'd Urin, is frequent enough; but that, being so finely strain'd through the most

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minute Passages of the Kidneys, being obstructed also by some gross matter, and dripping thence so leisurely, it's no wonder it should come away so pale. But in the former instances the Mineral Waters, and the other draughts come away so impetuously and swiftly, and consequently force those Passages, through which the vrinous Matter is usually filter'd, to a good wideness, should they pass through the whole mass of Blood, must necessarily be deeply tinged and be return'd Bloody: So that I cannot comprehend, but those Mineral Waters, fair Water, and white Wine in the precited instances, must pass immediately out of the Stomach into the *Lympha Ducts*, that are inserted into it, and thence to the Kidneys. As for the motion of the *Lympha* in the *Lympha-Ducts*, there is no humour, or Liquor in the whole Body, that in any compariton is moved so swiftly, except the Animal Spirits in the nervous *Lympha*, than which nothing can move swifter in the Universe, unless it be a flash of Lightning or Gun powder, there being motions of the Animal Spirits performed much more swiftly, than the twinkling of the Eye. Wherefore if the nervous *Lympha* is taken up, after it hath perfected its Office, by the *Lympha-Ducts*, though it must have lost some of its vigour, notwithstanding doth retain Animal Spirits enough to move quicker, than any other humour in the Body.

6. This premised Discourse leads to an observation many have made upon the sudden tumefying, of the Glanduls of the Breast, and recruiting the Milk of Nurfs, not long after they have swallowed down a good draught of warm Ale, Posset, Oatmeal-Caudle, Broath, or the like, any of which, before it can be converted into Chyle, and passed the Guts, and all the circulating Vessels and Bowels, and after distributed to the Breast, must the the work of Six or Seven Hours, whereas the

the before instanced filling of the Breast with Milk might happen in half an Hour, and sometimes a whole Hour after the using of those potable Aliments, which hath induced many Physicians to believe, that Milk is not engendred out of the Blood, but out of Chyle, though which way the Chyle should come thither, they could not readily apprehend. Wherefore if you please but to consider, how swiftly the *Lympha* in the *Lymphae-Ducts*, (which do all lead to some Glandul or other, and from Glandul to Glandul, betwixt all which Glanduls, there is, a very ready and speedy Communication and Commerce) is moved; its very probable, that upon extraordinary occasions the thinnest part of the Chyle may easily be propelled into the Mouths of the *Lymphae-Ducts*, terminating into the thick Membrane of the Stomach. This more then probable Opinion seems to be corroborated by an Observation, that my self, and others have made of Chyle, after it has been perfectly coagulated, being not only return'd at the Mouth by Hawking and Spitting, but coughing of it up. About Six or Eight Years since I do remember, I had a Scrivener applied himself to me, that was troubled with such a sort of Distemper, who having run through all the forms in the Town, was cured by me by a gentle Vomit, two or three Doses of Purging Pills proper for that purpose, and an Absterfive Apezem, that was likewise impowered gently to streighten the Mouths of the terminating Vessels.

17. As for the Sympathy between the Breasts and the Womb, by means of the *Mammary* and *Hypogastrick* Vessels coming somewhat near, though at distance enough, to which generally is ascribed the occasion of the engendring of Milk, and the Source of many præternatural Affections happening to the Breast and the Womb, I look upon as meer Visions, there being a much

nearer approach of the Vessels of several other parts of the Body to each other, between which no such manner of Sympathy hath been ever observed.

18. However to give you a greater Satisfaction, I will take the pains to examine this matter to the bottom. A Woman when arrived to a just Maturity for Conception or Fetation, is render'd disposed to breed more Blood, than sufficeth for the Nutrition of her Body, which superfluity if it be not timely evacuated one way or other, either by Monthly Vomiting of Blood, Hæmorrhage at the Nose, Hæmorrhoids, (all which on that occasion doth and hath frequently happened) or the natural way of *Menstruation*, this Female must necessarily fall into several sorts of Diseases, or Symptoms, as faintesses, swoonings, Palpitations of the Heart, loss of Appetite, Vomings, Indigestion, violent Head Aches, Convulsions and other Symptoms (which are ignorantly enough by some few Physicians, and that Sex, termed Fits of the Mother, or at least ascribed to them) though more commonly into a *Chloresis*, or Green sickness, which continue so long, as either nature through it self, or assisted by art, doth sequester the said Superfluity of Blood by the before mentioned natural course of *Menstruation*, at the terminations formed into *tubuli* dispersed at the bottom of the *uterus*, vulgarly call'd *Condylomata*. Now, when this Female doth happen to be impregnated, the Conception or Geniture cannot, or doth not stand in need of all that Superfluous Blood, to be thereby augmented before the expiration of forty days, more or less, at which time the Conception doth begin to want a supply of that Superfluous Blood, (which must necessarily be Arterial, as being the purest and fullest of Spirits, the venal being very improper for it, as being subject, as soon as it

it is come out of the Veins to coagulate) though not by far so much, as in any sufficient measure to take off the redundancy, which therefore must by the Veins be return'd to the whole Mass causing a Swelling thro' the whole Body, but more especially of the whole *Abdomen* or Belly, by reason of the depressed weight of the turgid Blood, so that, 1. Here is a blotiness of the whole Body, chiefly discernable in the Face and glazy waterish Eyes, besides the greater swelling of the Belly, which therefore you must not ignorantly imagine to be caused by the growth of the *Fetus*, which is still very small. 2dly, Here must follow a dejected Appetite, even to the nauseating of all sorts of Victuals, bycause there is already too great a Stock of Alimentary Humours in the Vessels. 3dly, Here must be frequent Vomiting occasioned by the remainder of the Chyle in the Stomach (that is not propelled thence, by reason there is no room in the Lacteal Vessels, being all cram'd up, to receive it) beginning to putrefy and corrupt into a great acrimony, vellicating the sensible coat of the Stomach, and consequently forcing it into Vomiting. The said corruption of the Chyle doth also cause a stinking Breath by steams arising from thence. So that you are not to conceive, that the last mentioned Symptoms proceed from the putrefaction of the redundant Humours in the Vessels; for that must cause a Fever, as somerimes it doth, though commonly it occasions an ill Complexion (as generally Women have about that time) and a remarkable feebleness in their Joints, by being overladen with the burden of Humours, and their Animal Spirits oppressed also by the same redundancy, so that the Woman doth not much care to stir about for that reason; as for her other Symptoms, as Tooth-ach, Head-ach, and the like Symptoms, which they were now and then subject

to before Conception, are chiefly caused by the swelling and rarefaction of Humours and Juices contained in the Vessels. All these prenumerated accidents continue so long, (and go off gradually) until the plastic faculty calls for a supply of Blood every day more and more, towards the augmentation or aggrandising of the *Fetus*, which as it gradually begins to assume all the redundant Blood, and sometimes more than all, if by a more vigorous plastick faculty disposed to be of greater dimensions than ordinary, so a Woman returns not only to her pristin Appetite, but a greater, and not only her former vigour of chylickation, and sanguification, but in this latter case, to a greater; and not only so, but returns again to her former healthy Looks, and Complexion, as also to her strength of Body, and sometimes in this latter case to a better Complexion and a greater strength.

19. When the *Fetus* arrives within some few Weeks of its determinated Extention, as it then begins to augment less and less, so the Blood must redound more and more in the Mothers Body, which must necessarily be impelled to these places, and parts, that are most empty, or have most room, which are the Breasts, that for a great while have hung loose, flat, lanck and flabby, where the Blood begins gradually to fill their soft and distensible Glanduls; but their passages and chanals being strait, and narrow, the Blood by its impulse and protrusion makes them wider and distends 'em, which is the cause, why a Woman upon the first swelling of her Breast feels a burning pain.

20. When by parturition the *Fetus* is expelled into the World, the redounding Blood cannot return easily to its former course of Menstruation, the *condylomata* or Tetts of the *uterus* immediately subsiding into the greatest straitness by the subsiding

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ding and relaxation of the intire *uterus* being discharged of the distention the *Fetus* occasioned before its birth; besides, those forementioned *rubui* or Tetts, are firmly cram'd and plaster'd up by a *muous*, wherewith the *uterus* is left well stored. So that there is no passage so easie and open to the redounding Blood, than what it so lately made or acquired in the Glanduls of the Breast, and therefore returns thither, and continues so to do, as long as the Mother continues a Nurse, and doth vent her Milk, but as soon as that vent is stopt, either by repelling Plasters, or want of discharging her Milk, the redounding Blood is forced back to the *uterus*, being constrained to force thorow those Tetts, that were dam'd up since the Parturition.

21. From this Discourse are deduced two remarkable Observations. 1. That the mistake was the greater in *Galen*, and all other Anatomists after him, *viz.* *Vesalius*, *Fallopianus*, *Varolius*, *Laurentius* and abundance more, in ascribing the Translation of the Blood from the *uterus* to the Breast, to the communication of the Hypogastrick with the *mammary* Veins in milch Women, by as much as the manner of that intercourse is not so obvious, and easily detected, as appears by the proceeding Pages. Besides that one Vein never doth take up Blood from another. 2dly, That those Symptoms of breeding Women, and others that attend, or precede the first Eruption of the *Catamenia*, are by the fore instanced Physicians either very erroneously explained, or their explanation wholly neglected. 3dly, That those foolish Aspersions, which *Aristotle*, *Albertus Magnus*, and the greater part of *Anatomists* do lay upon the *Catamenia*, and menstruating Women, *viz.* that the former are Venomous, dangerous, putrid, &c. and that the latter by looking or breathing upon a Looking-glass do stain it; and treading over

plants do kill them, and many such like assertions, are all fabulous, and utterly false. True it is, it may so happen, that the Menstruous Blood, though it is the very Flower of all the whole Mats, may by stagnating in the *uterus* putrety, and corrupt (*corruptio optimi est pessima*) and in unhealthy Women follow the nature of the intire Mats. or may by chance meeting with some *celluvies* of putrid excrementitious Humours (the *uterus* oft becoming a sink to the whole *Body*.) contract a *labes*, or putrefaction. 4thly, That sometime in breeding Women the redounding Blood is in part evacuated by Vessels terminating beyond the *os internum uteri*, and this in some few hath continued all the time of formation and augmentation to the parturition, and the *Fetus* notwithstanding hath continued sound and safe.

22. Touching the Experiment before mentioned, designed to discover the numerous insertions of all manner of Vessels into the Stomach, I shall here describe, as I made it many Years past. You must cause a Dog of a good Size to be kept from Food 24 Hours, and then feed him with White bread boild to a Pap in Milk, where-with you are to mix about half a Dram or two Scruples at most of *Mercury Sublimate corrosive*, if you add more, he will throw it all up. The adding of the Yolk of an Egg or two well beating and mixt with Sugar, will make the Pap swell the more in his Stomach. You are likewise to set a Pan of Water by him to lap his fill, to assuage the great Thirst the *Mercury* will occasion, and to yield abundance of moisture to fill all the Vessels of the Stomach and Glanduls of the Throat. About an Hour and half after, or not so long, the Dog being strangled, and tyed expanded in his Limbs to a Board, you must speedily, before he is cold,
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at one stroke make an incision down the *Sternum* to the lowest part of the Epigastick region; then make another, cross the lower part of the region of the Stomach, in order to remove on each side all the integuments together, that cover the Stomach and Hypochonders, as well as those that invest the Breast, which (I mean the Bones of the Breast) you are to cut on each side through the cartilaginous part to lay it open. Upon your first view the outward Surface of the Stomach appears so full of all sorts of Vessels, that will give you occasion to judge, it's made of nothing but Vessels, and ascending higher, the Gullet, Wind-pipe and Glanduls being filled and distended by moisture the *Mercury* hath forced up, do shew themselves very tumid and plain. After this you may open the Stomach, Gullet and Wind-pipe to inspect the inside. Upon the whole matter a Man might conclude, the intire Body to consist meerly of Vessels, and hollow Fibres coagmented together, so that the Glanduls seem to be only a contorsion chiefly of *Lympha-Ducts*, and some other Vessels, and so do the Bowels and other Fleahy or Sanguin parts appear a coagmentation of hollow Fibres; though seeming to be interposed with coagulated Blood, yet that in the Body whilst living is contained in hollow Fibres; for upon soaking any of those Sanguine parts or Bowels in warm Water, they soon do return to their natural colour and stringy substance. Bones and Grissels seem to be no others than Threads or Fibres coagmented together and hardned.

23. If most Diseases of the Body take their rise from the Stomach being preternatural affected; and Hunger and Thirst, being either præternaturally too much augmented, or decreased, are chief Symptoms of a Diseased Stomach, and of most Diseases of other parts, as well as they do oft become principal remote causes of most Diseases,
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it must be owned, that the right understanding of the causes, and manner how, of Hunger and Thirst, must be of the greatest use in Physick and service to Physicians in the practick, and of no less Satisfaction in the Theoretick part, since you can make a solution of a hundred Queries and difficulties, which by any other positions or suppositions cannot be performed so plainly, as by those I have lately set down, which though I may take them in some sort for Realities and Truths) I only do offer them as Phænomena's and Suppositions, which Freedom hath ever been allowed, though never so extravagant and subject to abundance of Objections and chatterings.

CHAP. VI.

*Of the passing of the Chyle into the Guts,
and its Depuration there.*

1. FROM what is in the 3d Chapter incidently discoursed, I return to a farther Explication of the Digesture of the Stomach, where the Victuals being dissolved, and by continuance of Concoction smoothed, and brought to an Equation, the Chyle doth then require depuration, which is a separation of the Thiner and finer parts from the groser and feculent, by a fermentative Juice, which I suppose to be an Acid, joyn'd to igneous Spirits, by an *intermedium* of some glutinous emplastic or gummous Particles, as may be discovered in Yist, or Levein. This Fermentation (I will only suppose) happens

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happens at the close of the Digestion, and begins to rarefie and huff up the Chyle in the Stomach, whereby the lighter and thinner parts become rising and swelling, and gradually work over the *Pylorus* into the small Guts, the Stomach in the same propotion contracting it self into a lesser and shallower compass, as it is emptying and growing less full, and less distended, by which means the trajection of the Chyle is facilitated, until there is nothing left, but a gross and a feculent acid Juice, serving to assist as a dissolvent to digest what may remain more difficult, be it some grisly or sinewy, or other tough hard part of the Victuals, Pyecrust, or any thing else that is more difficult to digest, than what is already wrought over the *Pylorus* into the small Guts; which being performed, the same acid Juice by its sharpness pricks and stimulates the Fibres of the Stomach, (contracting it self into a very narrow volum) throws that also, together with what it hath dissolved, over the *Pylorus*. Whence I do give my self a probable reason, why the latter part of the Digestion, and at the beginning of the fermentation of the Chyle upon its arrival in the small Guts, is always acid, and why at that time we are subject to sour Belches, and how it happens, that the fulness and distention of the Stomach, which most are sensible of at the end of their Meals, doth gradually lessen, and as soon as the soure appears is quite allay'd, and the digestion finish'd. And if I attribute not too much to fancy, I do observe, that many Persons towards the end of Concoction, do perceive an uneasiness of heat all over, especially in their Faces, extremities of their Hands and Feet, but particularly those that are weakly, as Hypochondriacks and Hystericks, who about that time, and a good while after, are subject to

to have flushings in their Faces, and their Symptoms (as faintnesses, palpitations, roaring Winds, &c.) set into motion: all which to me seem to be occasioned by the foresaid fermentation, through the quickness of motion of the fermentative Particles, exciting a heat and warm steaming *Effluvia*, rarefying the whole Mass of Blood and other Liquors.

2. Upon the dripping of the Chyle into the small Guts, the Fermentation is considerably augmented, by the meeting with the excrementitious Juices from the Glanduls of the *Pancreas*, and *Mesentery*, mixt with Gaul from the biliary Vessels, whereby the Chyle is wholly depurated of all its feculencies, which being separated, are term'd Excrements of the Belly. That there is such a fermentation in the Guts, appears by the tension and intumescence of the Belly, in some more, in others less, which may be perceived 2, 3, or 4 Hours after Meals, according to the expedition of their digestion, separation, and subsequent fermentation.

3 As I am not very flexible to recede from the general opinion of the Ancients and Moderns, importing, that the first Concoction is performed, either by virtue of the heat of the Stomach, or by force of Fermentation, as it is asserted by most of the learned, that were Cotemporaries with the famous Dr. *Willis*, and others that do succeed him: Neither am I willing to be thought so criminal, as to be contumaciously guilty of Heresie in Physick, yet its pardonable, if not allowable, to be Schismatical in ones proper opinion, which in all Mankind is free, and not to be compelled; and therefore I do declare, that nothing but late Experiments of no small number, do induce me to retract my former sentiments of this, and many other matters in Medicine, as firmly believing

believing, what I have expressed concerning the first Concoction, and Fermentation, as that the Sun is the cause of Day-light: though at the same time its very possible for me to be under a mistake. But all this being really true, or only in appearance, I am thence provided with the Solutions of hundreds of difficulties, offering themselves on those Subjects, and the full and plain discovery of the causes of many, if not most Diseases, and what is beyond all, not unsuccessfully conducted in the practical part; which to me is a satisfaction beyond what I have met with, either in conversing with Printed Authors, or with Men reputed very learned and experienced in the Faculty.

4. Upon the well beginning depends the well finishing and compleating; the Stomach, being the beginning of the whole Body, it is from the true knowledge of its Fabrick, Constitution, Action, or Operation the knowledge of the Constitution of all the Bowels, their Actions, and Operations of the whole Animal is derived. The Stomach is the only and true tuning, part of the whole Body, which being well or ill tuned, causeth a Harmony or Discord of all the Bowels. The Stomach being strong and vigorous, performing its Office, or Action, and Operation in perfection, renders the Body Strong, Healthful, and long Liv'd: but in proportion, as it is defective in any part of its Office, Diseases in it self, and all other parts of the Body are engender'd, answerable to the degree and quality of its defect, and to the dependency all the Bowels have on it; for being the Laboratory of the whole, whatever is ill prepared here, cannot be mended afterwards, by any of the succeeding Bowels, the Chyle being vitious or corrupted, can never be converted into good Blood, nor that into good Animal Spirits, no more than

than you can make good Butter or Cheese out of soure or corrupt Milk. And as most, it not all internal Diseases (Endemic and Epidemic excepted) are Originally produced in the Stomach, they are likewise to be cured by internal Remedies exerting their first and stronger force upon it, the virtues whereof it afterwards transmits to the part Diseased. Neither is it to any purpose, to pretend to cure any internal Disease, without first of all having put the Stomach into good order, which done, most Diseases are ready to go off of themselves.

5. The Stomach bears an adequate Analogy to the root of a Tree, and may properly enough be called the Root of a Man; for as the root of a Tree is the beginning of it, receives or draws the juice of the Earth, to prepare and convert it into Food for the Trunc, and all the Branches, and being well digested, transmits it to all the parts; in like manner, when the Tree is observed not to be thriving, or the Branches to be decaying, changing of colour, withering, or dying, where do they look for the Cause, but at the Root of the Tree? Even so is it with the nourishing of the parts of the Body, and the Diseases they ere subject unto, in relation to the Stomach.

C H A P. VII.

*Describing Medicines to preserve Health,
and their Preparations.*

1. **BY** the deduction from the preceding Discourse, my Opinion persuades me, that the weakness of the Stomach, and its faintly performing its Office, is only occasioned by the debility of the Stomach Nerves, and their numerous Branches, by being plaister'd up by too much Fleam, gross acid dregs, indigestible Meats, or offensive Drinks, or other matter admitted into the Stomach, which by lodging there too long, assume a corroding Quality; or by too much heat, and too little moisture, are converted into a nidorous crudity. This supposed, I do believe, and have experimentally observed, that all those Corroboratives of the Stomack, whose vertue is commonly asserted, to consist in a gentle restrictive and warming Quality, whereby those slimy Humours are more firmly cemented, such as *Aromaticum Rosatum*, *Caryophyllatum*, Cinnamon-Water, those hot spicy Brandy-waters, a red Tincture of Roses, Methridate, Treacle, all those Compound Electuaries framed of heating Conserves, Condit, and Peptick Pouders, are so far from contributing the least strenght to the Stomach, that rather a contrary effect hath ensued, and being long continued do carry danger with them. The only means I have hitherto found to strengthen the stomach, are proper absterfive Medicines, gently wiping off those clammy

clammy substances from the tunic of the Stomach, and the terminations of the Nervous branches, and among these I have not yet detected any thing, equal to a good *Elixir Proprietary*, well prepared by a long Digestion in a Sand bath, the proportion of the Ingredients being somewhat altered from the common, and something also substituted in place of the Myrrh: A drop of this shall exceed a pound of Peptick Pouders, Electuaries, and other sop Stomachicks. Do only keep your Stomach clean, you will certainly preserve its strength, and prevent most Diseases. *Herodotus* (in *Euterpe*) who was cotemporary with *Hippocrates*, tells us, that the *Egyptians*, to whom the first invention of Physick is ascribed, used to take Purging-physick for three days together every Month, for no other purpose than to cleanse their Stomach, knowing they could be subject to no Diseases, but what the foulness of their Stomach might occasion, in regard their Bodies were strong, and their Air the most clear and temperate in the World.

2. It is not to be understood, where a heap or weight of Crudities is accumulated, so gently absterging a Remedy can have a power to disengage the Stomach, no more than a wet Mop can be supposed to rid a Room of a heap of Rubbish, in which case something more stimulating is required, that may be used in all seasons of the Year, be it sultry or friezing, without the convenience of confinement to Diet, or warmth of Air, and without offence to the Stomach, or putting the Body into any disorder, to which purposes, the Pill I here now describe, I have Experimentally found to be effectually answering in most respects.

3. Take one Ounce of the clearest shining Aloes, which at the Druggists will cost about a Groat, or sometimes Six-pence an Ounce, and which

which being free from any considerable dross, will not require any depuration. Pouder it in a Mortar, covered over with a brown Paper, having a hole in the Middle for a passage to the Pestil, to prevent the little pieces of the *Aloes* from leaping up, while you are in the beginning of your pounding; for afterwards the Paper may be removed. Observe to anoint thinly the bottom of the Mortar and Pestil with a little *Florence Oil*, to keep it from sticking to the bottom. When its reduced to a gross Pouder, by grinding it with the Pestil you must bring it to a smooth fineness. Put the Pouder into a small glazed flat bottom'd earthen Pan, that will contain about half a pint pouring upon it about a quarter of a pint of fair water, wherein hath been dissolved two Drams of *Spanish Juice of Liquorish*, which is done by slicing it very small, and setting the Water in a Porringer over a gentle heat; place this small earthen Pan into one somewhat bigger, having Sand in the bottom to the height of an inch, and afterwards filling it up to the brim. Set them over two piles of Bricks, of three or four Bricks high, laid flat. The Piles must stand at such a distance, that they may reach the edges of the bigger pan, to support it. Then make a moderate fire of Charcoal under it, to heat the Sand, to cause the superfluous moisture to be evaporated, until the *Aloes* is brought to the thickness of the Honey. Or you may by dropping two or three drops on the back side of a Plate to cool, make trial, whether it be reduced to the consistency of Dow; for if it be over-done, the mass being render'd brittle, will not only lose most of its virtue, but also its aptness of being framed into Pills; and if it be not evaporated enough, it will be sticky and not apt to be brought to a Mass.

4. The lesser Pan being taken off, when the

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evaporation is sufficient, before its quite cold, you must with a *Spatula*, or slice, take out the Mass, and between your Fingers, being a little anointed with *Florence Oil*, or Oil of *Sweet Almonds*, to prevent the sticking, rowl it into a round ball, which you may keep in a Sheep's Bladder, being likewise thinly wetted over on the inside with the same Oil, for many Months, if necessary, without any great impair of its vertue.

5. A small piece of this Mass being form'd into six, seven, eight, or nine little Pills, of the bigness of a Pepper-corn, is a Dose sufficient to give two or three motions according to the number of Pills, and the loose or costive Constitution of him that takes them. The safety of this Medicine adds much to its Character, since the taking of one Pill or two, more or less, imports as little hazard, as the taking it very oft, or in any kind of Season, be it hot or cold unless your Body be subject to a Looseness, or the Hemorrhoids, or your Constitution be thin, hot, and dry.

6. By the addition of the Juice of Liquorish, the *Aloes* is design'd to be obtus'd in its too pungitive quality, whereby its apt to raise the Piles, and becomes somewhat less precipitating, and consequently hindered from lessening expectoration; which in this Climate is so necessary in Coughs and Phthysicks.

7. The same correction may also be attained, by dissolving the same proportion of clean *Aloes*, in half a pint of Juice expressed from the contusion of an Ounce of *Bugloss*, or *Borrag* Roots, or a large handful of their Leaves, and stirring half a pint of warm Water with them in the bruising, and clarified by subsidence, in letting it stand in a Cellar for a day or two, and pouring it off the Fæces or Dregs in the bottom.

bottom. This evapourated in the same mannest will produce a Mass, almost equal in goodnee with the former.

8. I cannot hitherto observe, that the use of these Pills, though frequently taken, either once in a Week, Fortnight, or a Month, according to the time, the Stomach by reason of its degree of weakness in the digestive faculty may require, doth in any wise debilitate those, that may properly use them; but on the contrary, rather corroborate their Stomach, by assisting it to throw off that heap of rubbish, and crude Humours, which those that eat and drink plentifully, and either live sedentary Lives, as many that are Educated to Professions, or others that are not used to exercise or labour, are subject to engender, especially if naturally of a weak Constitution, or of an advanced Age.

9. For three or four days succeeding the use of these Pills, a good *Elixir Proprietatis* taken Morning and Evening, in a proportionable Dose, hath by my Observation ever had the good effect of preserving Health and preventing Diseases.

10. To what I have mentioned touching the advantages of a familiar Acquaintance with those Mundifiers, both the Pills and the Elixir, the enquiry I made of a fresh colour'd vigorous *Dutch* Burgher, I casually met in my Travels, who exceeded the Age of fourscore, may in somewise add a confirmation. He did aver to me, *Bona fide*, That for 40 Years last past, he had seldom or never omitted once in a fortnight, or somerimes sooner or later, according to the directions he received from his marks of fulness and uneasiness, to cleanse with Seny stewed with Prunes, from which custom he did derive his capacity of Eating a hearty Meal of any thing he liked, without advising

of the wholesomness or easiness of Digesture, and at times of drinking a Glass of Wine to an Altitude, to accommodate his Friend.

11. As lesser Purgatives do rather contribute strength by their consequence, so the greater being properly used, do not carry that danger with them People commonly imagine, since I have known many, that for three months successively, have taken strong churlish purging Pills every Morning, some few days only omitted; I may say, some have swallow'd a pottle of strong Purgative Pills in a few years, and liv'd in full health to a remarkable Age, and not without a Libertine Mode of Eating and Drinking. Whence its apparent, that the toughness of the Nerves, upon which the strength and action of the Bowels only depend, doth suffer as little by the strongest Purgatives, as an *India Cane* by a thousand times bending, which notwithstanding will recover its former figure and full strength. It were to be wish'd, that Bleeding could be administred with the same safety, of which it may be justly said, that the *Lancet* hath, and doth in proportion, kill more Men than the *Sword*; and it's as commonly observed, that those Physicians who do so generally practice it, know little else what to do; and on the other hand, their Patients are as rash and prodigal of their Lives, to submit to their heedless Advice. As the first and second Bleedings may be of great use to many Bodies and Distempers in the colder climates, so I have ever remark'd, that the third and fourth have proved as detrimental, and not seldom fatal; having observ'd, that with two Bleedings at most, succeeded with other Remedies, incomparatively more continual Feavers, Rheumatisms, Pleurifies, and Pthyicks have been cured, then have survived those frequently reiterated Bleed-

Bleedings, which in common Practice usually give the parting blow.

12. Its a consequence an Ideot infers, because a Person having been blooded eight or ten times in a great Distemper, doth recover his Health, he owes the benefit of it to the bleedings, whereas it ought rather to be said, neither the Distemper, nor Bleeding could kill him.

13. To return from this Deviation to the use of Purgatives; tho' those that are strong, are required in great Diseases, they ought to be avoided in lesser Distempers, or where prevention is only intended; for all Purgatives deriving their power from a specifick fermentative Spirit, or Salt, by rarefying or huffing up morbidick Humours, and afterwards by stimulating the Nerves to throw them off after separation, when strong ones are taken, where no Disease is engendr'd, they are apt to cause one by fermenting, or rarefying and stimulating the laudable Juices or operating upon those dormant humours, which by strength of Nature, or assistance of mild preventing Purgatives, and absterfive Corroboratives, might easily have been worn off. Thus it hath oft been observed, that some by taking *Extractum Rûdij*, have soon after fallen into a continuall Feavers; others through a preventing care to avert the Gout, have immediately fallen into a violent fit, upon taking *Elixir Salutis*, *Bromfield's Pills*, *Golden Spirit of Scuroy Grass*, or the like empirical Medicines, which is not all the Mischief such sort of Purgative vendibles have occasioned, as being unskillfully invented, and more unskillfully prepared, since not a few have been thrown into mortal Diseases by the use of them. Yet I stand more amazed at the folly of Mankind, that is so easily allured by vain boasting and mendacious *Encomia's* upon *Laudanum liquidum* plain.

plainly prepared, or disguised by a solution of *Opium* into volatile oleaginous drops, to the frequent and constant use whereof, a Man being once debauch'd under pretence of ease and quieting himself of a few Gripes, Fumes, or Vapours, he can no more leave it off for a fortnight, a week, or a day, than a Labourer his Bread and Cheese, or a Man throw off his Coat and Waistcoat in a hard Winter, or a Brandy-Drinker forsake his Spirits and return to small Beer. Using ones self to such plain or disguised Opiates, is like making a contract with the Devil, to live easie and well for a few Years, upon condition he shall have his Soul to torture afterwards: For certain it is, that the familiar use of Opiates, after some Months, or very few Years, either doth wholly desist from being friendly, by suffering your trouble or Distemper to return in a more horrible manner, or create a new one, incomparably worse than the former, or strangles you with an Apoplexy, or some other soporous Distemper, which is most amply proved by those, that make *Opium* their Sacred Refuge in every fit of the Cholick, Gout, or Stone, who seldom or never fail of a speedy *Exit*, by some incurable Disease of the Brain, in very few Years; and those that do advise such a lethiferous remedy for a common use to their Patients, have a greater title to a Halter, labell'd with an inscription of *Mathews's* Pills, or Pacifick Drops, than those, that murder a Man in the High-way. In short *Opium*, *Laudanum liquidum*, *Diacodium*, and all other strong narcotic Medicine, do destroy the Brain and the Nerves, and consequently occasion weakness of the Stomach, Nerves, Numbness, Palsies, Lethargies, loss of memory, and dulness of Understanding; diminish and deprave all the Offices, Actions or Operations of the Bowels,

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suppress the Appetite, occasion a wildish countenance and paleness, and at last upon long usage usher in Death. In what manner those fits of Gout, Stone, Cholick, and other sharp torturing Gripes, appear to me to be occasioned, and by what causes, I shall give my opinion after this following Interlocution.

14. I have in the preceeding Discourse given you my Sentiment, that to preserve Health, and prevent Diseases in valetudinary Constitutions, (for strong vigorous Bodies stand in no need of other preservatives, or preventives, than moderation in their *Non-naturals*, the knowledge and sense whereof, Nature hath implanted in all other Animals, as well as in Men,) no better ways and means can be used, than applying at certain intervals, to those cleansers or abstersives here before mentioned; as for *Aurum Potabile*, or any pretended *Lapis Philosophorum*, or all *Faber's* Quintessences, upon their just trials, they have been found to contain less vertue in preserving Health, than a good Chicken Broth.

15. You may remember a caution was given in one of the foregoing Paragraphs, interdicting all Aloetics to thin, hot, and dry Bodies, and such also as are subject to the Hemorrhoides; and in regard that such Constitutions, especially when promoted in Years, do also require the keeping the Stomach, clean, and free from all slimy and nidorous crudities, I do recommend a good *Lenitive Electuary*; not the common, which is so ill contrived, and filled with rubbish. This following description gives you the form of an easie, gentle, and effectual Laxative. Take four Ounces of the best *Cassia Fistularis*, newly drawn, and evaporated to a consistency, (the manner of doing it you may read in a Treatise, called, the *Family Physician and House Apothecary*,) *Rhubarb* powder'd, white *Mecchoacan* grated and powder'd,

and clean *Rhenish Tartar* powder'd, of each a quarter of an Ounce, *sweet Fennel-Seeds* powder'd, a Dram and half, Syrup of *Musk-mallows*, as much as will suffice to make them into an *Electuary*. You may take hereof a quarter, or half an Ounce, or sometimes a whole Ounce. dissolved in a quarter of a pint of thin *Grewel*, *Barley-Water*, *Posset*, or thin *Chicken broth*, once in a Week, Fortnight, or a Month, according to the direction given concerning the *Aloetics*.

16. *Rhenish Tartar* I do prefer for a *Laxative*, far before *Cream of Tartar*, which doth lose a great part of its solutive vertue in the preparation.

C H A P. VIII.

Of a third Medicine, without which the Design of this Treatise would be frustrated.

1. **I**N regard that some Persons, though never so well in health, and for that reason not standing in need of any Medicine to clean their Stomach, yet it may now and then happen, that accidentally feeding too plentifully upon what is very acceptable to their Palars, or upon longer Fasting than usually greedily, swallowing down their Victuals. or eating meats they are unaccustomed to, or such as are very hard of Digesture, or others in too great a measure or that in themselves are very noxious, as *Muscles*, *Mushrooms*, *Cucumbers*, and the like, they fall

fall into sudden violent pains, or great weights and oppressions of their Stomachs, and by them into a great disorder of the whole Body, so as sometimes to be in danger of being cast into a Fever, a great Head-ache, violent pain in the Back, Vertigo or swimming in their Heads, and many other inconveniencies, in which cases should they fly to either of those preventing Laxative Remedies before described, in stead of receiving benefit or ease, they must rather expect an hindrance of Digestion, and increase of these uneasinesses and pains, recited before. So that unless I do recommend a third Medicine, which will be described below, the chief purpose of this Treatise will be in a great measure frustrated, and the work remain imperfect.

2. As these inconveniencies may happen to healthy Persons, so those that are valetudinary and subject to recurrent Head-aches, sharp Gripes, Cholicks, Hypochondriac Fits (in Women vulgarly termed Hysteric) Fits of the Stone, or Gout, Diarrhæas or Loosenesses, &c. are exposed upon committing the foresaid extravagancies in their Meals, not only to those accidents already mentioned, but also to these just now set down, which uniting together may in danger the Life of these valetudinary Persons, by suddenly throwing of them into a mortal Disease, all which accidents can much less be abated or removed by either of the already described Laxatives in these latter, valetudinary, than in the former healthy Persons, and therefore do much more stand in need of this third Medicine than the others, being in their full health, whose strength of nature must be thought more powerful to struggle with this sort of plenitude of their Stomach.

3. It is not only within the power of Emetics to cause these sudden violent Disorders, but

but also of *Potables*, that are oft noxious in themselves, as Wines adulterated, or mixt with others of another kind, saturated with a pernicious sort of lees or *Tartar*, and united together by fermentation through the addition of poysonous ingredients, or raw windy Cyder, or heady Mead, or Artificial Wines made of the Juice of Cherries, Goosberries or Currents. A debauch of any of these Liquors, as also of thick muddy Ale, March Beer, *Nottingham* or the like Ale, or *Englisch* Spirits, will not only suddenly occasion the same accidents, as those *Edibles*, in the strongest and healthfulst, and much more in the valetudinary Men, but much worse, as Apoplexies, Palsies, Fevers, loss of Speech, &c.

4. Since those Symptoms, that are caused by the sudden repletion of the Stomach, cannot be so speedily eased and removed as they necessarily do require, by purging Remedies, being on this occasion very improper, and tedious in their Transportation through so long a space as the round about of the Guts, it then remains, that nothing can prove a more adapted Remedy than a Vomit, that will throw up immediately through the Gullet, being a short passage, all the whole burden at once, and operate kindly without disturbing any of the other Bowels, or raise a mud in the Humours. By these Conditions all Antimonial Vomits are excluded, as being too long before they operate, and too churlish in disturbing all the Bowels, and exciting a violent commotion in the Humours. *Aserum* Leaves or Roots are subject to the same inconveniencies. Neither will Oxymel of Squils though dissolved in Water made bitter with *Carduus*, work quick or safe, without a great deal of Posset, or much prompting the top of the Gullet with your Finger, and sometimes will not operate that way. Warm Water and Oil

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is worse. *Hypocuanus*, that new Fangle brought by the French, from the *West Indies*, is the Root dried of a meer common *Fucus*, whereof in the places where it grows, you may buy a Cart load for a Two-penny Looking Glass, or a penny worth of *Bugles*, though at *Paris* they have the confidence to sell it at 30 or 40 Livres the pound, which notwithstanding our *Asarum* Root doth far exceed in the Operation, and beyond all comparison is much less nauseous in the taking of it, than which there cannot be a more unacceptable Drug to the Taste in the World; and for all the sputter they make with it, I should prefer the Roots of our common *Fucus*, growing in stinking Ditches. Wherefore by this Description, you may believe, it doth in no manner answer the design here. so that among all Emetics, Vegetable or mineral, nothing doth equal more with all the conditions requisite to our purpose, than *White-vitriol* prepared in the manner I shall describe to you, proving a very easie, gentle, and safe Vomit, Operating so nimbly, that its scarce an half Hour, and very oft not more than a quarter, before it begins. For Cheapness it exceeds all others, a Dose of it not much exceeding an Half-penny. It may be kept always ready upon every occasion, without making any busle, and is so lasting, that its virtue continues for several Years: And for the most part it will move a Stool or two, or more, whereby it carries off those Crudities, that are remaining in the Stomach, or that are escaped into the Guts.

The Preparation is as follows,

5. Take of the purest *white Vitriol*, wherein not the least speck of red can be seen (though sometimes it may grow redish by dampness) one Ounce and half; being pounded and grinded very fine, put it into a Glass-pottle Bolt-head;

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pour upon it a Pint and half of clear Spring Water, and half a Pint of clean *English* Spirits, once rectified, which they call double Spirit. close your bolt head with a Cork, and w^ea bladder over that tyed with Pack-thread, or close it by putting the neck of a lesser Bolt-head into the Neck of the other, that contains the ingredients, fasting a piece of wet bladder with a Pack-thread round about the Juncture. Place the Bolt head standing upright in a Sand Bath, and let it digest with a moderate warmth for 24 hours. But remember to shake the Bolt-head very well, before you place it in the Sand. After this Digestion, decant the Liquor gently, into a Glass Funnel, wherein is placed a Coffin of Cap Paper folded according to art, and so let it filtrate into a Glass Bottle; when it is almost quite passed through to the quantity of a Spoonful, take out the Funnel, and throw away what's left in it. If you do filtrate it twice over, it will be the clearer, and more depurated. The Bottle that contains the Vomitive Liquor is always to be kept very well stop^t.

6. When you find occasion for using this vomit, you must pour out three four or five Spoonfuls, according to your easiness or difficulty to Vomit. But commonly three Spoonfuls is sufficient to most Persons. This must be mixt with double the proportion of warm Small-beer, or warm Water, wherein a little *Carduus* hath been boil'd (as you may do likewise to your Small Beer) or *Carduus* Posset, or thin Grewel, then then drink it off. If this should happen not to work in a little more than a quarter of an Hour, you may take a Spoonful or two more of your Vomitive Liquor mixt, as is said before, with warm Small-beer, or if you are unwilling to take more of the Liquor, you may load your self with *Carduus* Posset, or *Carduus* boil'd in Water, until

until you Vomit. The safety of this Vomitive Liquor consists in this, that if you take a Spoonful more or less, there is no manner of hazard in it; and in regard it operates without disturbing of the other Bowels, or raising any Fermentation, Ebullition, or Disorder in the Humours, contained in the Vessels, which most other Vomitives do, and therefore cannot be taken without Advice, this may be taken safely in the beginning of most Distempers, without any further Consultation.

CHAP. IX.

*Causes of the Stone, Gout, Cholick, Pleurisy, Rheumatisms, Apoplexy, &c.
Assign'd from a different Hypothesis.*

I. **T**ouching the Causes of those Pains, which are felt to be the acutest and most exquisite of any by them, that suffer the Stone, Gout, Cholick, and sharp dry Gripes; certain sharp subtil serosities, or rather a vitiated lymph discharged from the Brain through the Nerves on the Extremities, being there lock'd up, cause those corroding Gout-Pains, upon those sensible nervous parts, though sometimes serosities, and lymphatic fluors, dripping from other Vessels, may cause great pains, but less sharp, and being more subject to be incrassated, may cause swellings near the Joynts. The same subtil nervous serosities, or vitiated *Lympha*, being thrown upon the Kidneys, tare and vellicate their most sensible

ble Membranes to such a degree, that scarce any tortue can equal it, and that sometimes, though seldom, without the least suppression of Urine, but for the most part with a total, or partial suppression, and a great sharpness of Urine, which is then called a Fit; the pain which at other times the Stone in the Kidneys doth occasion, being only a heavy obtuse pain of a long continuance, and more frequent returns, which at great intervals, as Spring and Fall, doth invite those cutting serosities to the part, and then also are the greatest Fits; for I cannot conceive, that the Stone turning angular, and grating upon the Membranes, is so general a cause of the Fit of the Stone, as many of the Learned do imagine, since a Stone once removed out of its bed or seat, whereto its cemented by a glutinous tartarous slime, can not easily, if ever return to its place, and be there fastned again as before, for which reason Physicians are very cautious of administering strong Diuretics, for fear of driving the Stone out of its place. Neither do I believe, that those bloody Urines, which are so frequently made by Nephritical Patients, are caused by the corners of the Stone being moved, and wounding or grating of the Veins, but are rather caused by a sharp Serum corroding the Mouths of the Vessels; or blood may be squeezed out of the Vessels by the internal swelling of the *Parenchyma* of the Kidneys. It doth oft happen, that some of those forementioned most subtil limpid serosities have taken another chanal, though branches of the same Nerve that tend to the Kidneys, being divaricated and inserted into the great Gut of the Colon, where they cause that great pain, (though less acute than the other, that part being much less sensible than the internal membrane of the Kidneys,) which is termed the Stone Cholick. Since then this acute pain
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in the great Gut cannot be caused by the Stone, at that distance, its more than probable, that those most exquisite pains in a. he must be occasioned by some other cause, which by many Arguments to me can be no other, than the *lovesaid* Seriosity. *Secondly*, You must consider also, That all Opiates being inwardly taken, perform their Operation by exerting their power upon the Brain, *in principio nervorum*, in withholding the influx of the Animal Spirits, (that communicate Sense to the Guts,) and strenghtning the Nerves, whereby pains are not only appeased in any singular part, but in all parts equally, supposing they were all in pain. *Thirdly*, You are to conceive, that there being a digestion perform'd in the Brain, in converting the Arterial Blood into Animal Spirits, their must be a solution, and afterwards a separation and expulsion of Excrements, whichin part are a limpid Serum, that is abandon'd to the Ventricles of the Brain, which are the proper receptacles of that excrement, as much as the thick Guts are of the Excrement of the Chyle, or the Bladder of the Urine, being the Excrement of the Blood. *Fourthly*, This concession is also required, that this most subtil sharp excrementitious serosity, having quite filled up the ventricles of the Brain in a greater measure, than they can well contain, or throw off through those passages Nature hath ordained, the thinnest part is forced into the *principium nervorum*, (the other part being received into the Veins and *Lympha-ductus*,) are carried either to the Extremities, or Kidneys, where it causeth the Gout or Stone, or to the Teeth, where it occasioneth a most exquisite Tooth-Ach, or to several external parts or joints, producing those violent pains, that are termed a Rheumatism, or to the *Pleura*, where those shrieking Pleuritic Pains

Pains do ensue. Summarily I do believe, there scarce happens any pain, (unless caused from without) Tumor, or Pustul, where this nervous Excrement is not a principal cause, which may be more clearly explain'd in another place.

2. Against this Discourse may be objected, That the Nerves obtaining no visible hollowness, cannot be supposed, to transmit such a quantity of *Limpid Serum*, as must be conceived to cause those before recited Diseases. Secondly, That its uncommon, and not natural, for any sort of vessels in the Body, that are destinated to contain, and convey their natural and proper Liquors, Juices, or Humours, to convey any other that is excrementitious, or præternatural. To the first its answered, there must necessarily be proportionable cavities in the Nerves, to contain such great measures of Juices, as have been frequently observed to drib from the Nerves, though small ones, that have been cut through in Wounds and much more from great Nerves; and therefore those larger Nerves near the Brain must be thought capable to contain a very copious quantity of moisture. If the Nerves when cut out of the Body and Dead, do not shew any visible cavities, it is bycause being emptied of their Spirits, and a great part of their moisture, their pores and chanals do subside and fall to a close compactness. Besides, a Nerve that is cut out, and grown from a greater bigness to that of an ordinary Packthread, when its dried and condensed, is reduced to the smalness of a fine Thread or Fibre, which when it was tumid within the Body, and fully extended, must necessarily have contained a great hollowness, though divided into innumerable very small or minutest passages. In answer to the Second, it hath been more than once observed, that purulent matter from Impostumations in the Lungs, and *Pleura*, hath been evacuated

evacuated through the Kidneys and Bladder by Urine, whither it hath been circularly conveyed by the Veins, that have taken it up. The thinner part of the Turpentin, that by Glyster hath been injected into the great Gut, hath been taken in by the Vessels, and by circulation carried to the Kidneys and Bladder, as appears by the Urine, giving by its strong smell of Violets a plain evidence of it. True it is, these Instances are not natural conveyances, neither is it to be understood so of the Nerves, but to be preternatural.

3. This premised, if you apprehend this *Hypothesis* to be only probable, or apparent, (which I do believe to be Truth, though at the same time I must own, that I do retract from my former Opinions, being thereunto induced by sundry Experiments and Observations) it must necessarily follow, that Opiates frequently used, do at length not only withhold, but intirely stop the afflux of the Animal Spirits, and closely shut up the beginning of the Nerves, whereby those acute serosities are pent in, and thrown back into the medullar substance of the Brain, which hapning, an Apoplexy, Palsie, Lethargy, or some other Mortal soporosis Disease must unavoidably succeed; and hence it is, that in all those, who expire upon their seizure with those Distempers, the anterior Ventricles of the Brain upon Dissection, do ever appear filled with such a sort of acrimonious limpid serosity, the Nerves and other Vessels being either too much filled, or too much closed by subsidence, obstruction, or otherwise, to admit of regurgitation thence.

4. Notwithstanding though the daily, weekly, or frequent use of Opiates is most certainly attended with most pernicious consequences, yet the extraordinary and stupendious benefit it imports, even very oft to the recovering a Man

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from the Jaws of Death, when cautiously and necessarily advised in a fit of intollerable pain, a profuse Hemorrhage, an impetuous Catarrh, violent Vomitting, a fluid *Diarrhea*, long and strenuous Hysterick Fits, when they begin to threaten danger; want of Sleep for many Days and Nights, and such like urgent symptoms, may give a Just cause to hold a correspondency with that or the like Medicine, provided it be not too familiar, and be very well prepared, and that in the interval you prevent the necessity of calling this dissembling pacifick Friend in again, by removing the cause of those hazardous Diseases, and that the Patient have Strength, and Spirits enough to wrastle with such a fallacious and dangerous Guest, should he prove too rude. Wherefore I account it the greatest boldness in so many little Quacks and Empiricks, even some Widwives, and Nurses also, who being intirely destitute of the necessary skill in preparing this ruffian Juice, and much more of the true knowledge of applying it, dare assume the confidence of administering it so indifferently to the loss of so many Lives, who in my Judgment can scarce have too severe a Law made against them, especially where a Man may be Murder'd privately, without giving the least jealousy, that any thing else besides his Distemper killed him.

C H A P. X.

Hypotheses of the Motion of the Heart,
and of Respiration.

1. **I** Have for a long time with an implicit Obedience submitted to the *Dogmata* of the Ancients, confirm'd by the approbation of the Learned succeeding Ages, as appears in former Writings, touching the Animal Spirits and Pulsation, which latter in the Heart and Arteries is by them resolv'd, to be caus'd by a pulsifick faculty in both, or as some will have it, originally in the Heart, and from thence derived or continued in the Arteries. This sort of explication now appears to me very negligent, and universally applicable to any thing; for to say, the pulsation is caus'd by a pulsifick faculty, is equal to saying, that Sight, Hearing, Vomiting, or Purging, is perform'd by an Optick, Auditory, Emetic, or Carthartic faculty; or to be shorter and more general, by a specifick or occult faculty; from which any inquisitive person can receive but little satisfaction, or scarce make a solution of any *Phænomenon*, with the least advantage to the practical part of Physick. Wherefore to make my marks bear the better, in resolving many doubtful Queries, and serving for a true and safer conduct in the practick, I do rather make choice to say, (in imitation of *Copernicus's* affirming the motion of the Earth to the exclusion of that of the Sun or Firmament) the Heart and the Arteries do not move the Vital or Arterial Blood, but that the Blood moves the Heart and Arteries to a pulsation, in the same

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manner as the Water above the Water-mill doth as it were) originally and immediately move the great Wheel of the Mill, which on this occasion bears the same office of the Heart, throwing and dispersing the Water into all such chanals and Creeks, as are found to be below it; and if those Chanals and Creeks should be so framed, and dig'd to come round again, at some distance above the said Mill, to open and disburden the said propulsed and dispersed Water into the first chanal above the Mill, that did originally throw off, and disperse the Water, this would make a plain circulation in the Water, and as it were a *perpetuum mobile*, as there is in the Blood above the Heart, and that below it: Now, to me it would be a very senseless Assertion, to say, that the Wheel of the Water-mill is the chief and original cause of the Water moving, or being moved, or thrown off below the Mill, whereas it is evident to Sense, that it is the Water above the Mill is the immediate chief, principal and as it were original cause (though the true first and original or remote cause of the motion of the Water and of all other motions of Bodies in the World, is the *Æther*,) and the Air is the nearest and immediate cause of the motion of the said Wheel and Water below it: for stop the Water that flows to the Mill from above it, the motion of the Wheel and of the Water below it immediately ceaseth. If these matters should be in reality true, as they seem to me to appear, then there must have been a considerable Error in all Philosophers and Physicians from the beginning to this time, in maintaining that the Heart is the first living, and the last dying; whereas if Life doth consist in motion, as most certainly it doth, all parts have their beginning of life at once, tho' they do not dye at once; for its possible for a Man to have
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a Leg, or an Arm, dye or mortifie, and yet the whole Body live many Years afterwards. Neither can, or do they assert generally, what doth move the Heart, for some that will have the Heart to be a Muscle, attribute its motion to a self moving Property, by means of the Animal Spirits, that are conveyed to it by that single Nerve, that's implanted into it; but as I have expressed in another place, the Heart is no Muscle, but hath only a resemblance, or bears an Analogy to it. Others ascribe this locomotive faculty to the *Sulphur*, that's perfused in the Heart, exalting and rarefying the Blood, by means whereof it is thrown out, as it were with a Spring; but this *Sulphur* wants proof.

As for the motion of the Infant in the Womb; that neither breaths, or moves it self, neither doth the Blood circulate before it is thrown out thence into the Air, which sets all in motion. The use of the umbilical Vessels, seem only to convey so much Blood to the *Fetus*, as is necessary, and return what's superfluous back to the Mother. Possibly you may object, that the Infant doth very oft move, as soon as the Mother is said to be quick, which is a mistake; but they are the Spirits, that come from the Mother, do stir it; for upon a Womans laying her Hand upon the Womb, the Child is apt to be stirred by the rarefaction of the Spirits in and about the Womb occasioned by the laying her warm Hand on that part. As long as the Child is in the Womb, it doth not live of it self, but lives by and in the Life of the Mother, as an Apple upon a Tree cannot be said to be nourisht, increased and as it were live, but by the Juice, that comes out of the Tree, and may be accounted in some sense a part of the Tree, as the Child may be taken in the same Sense to be a part of the Mother. Neither doth the Child upon its maturity move it self out of the Womb in its Birth, but the Spirits of the Mother move it by rare-

lying all the Spirits and Juices of the Child, where unto the Diaphragm of the Mother, and the motion of the *Abdomen*, are great adjuvant Causes; for its oft experienced, that a Woman hath the power of retarding her Labour by keeping back her throes, that is, by suppressing of the motion of her Diaphragm and of the muscles of the *Abdomen*.

The Air pressing and filling the Lungs, they at the same time press the Air, that fills the interstice between them and the Diaphragm, and in a great measure moves the latter to a dilatation in the *Inspiration*, lifting up at the same time the Belly with all the included Bowels, and crowding or condensing the ambient Air, the weight whereof (if I may so call it) or its inclination to be relaxed again, (in endeavouring to return to its former position,) together with the fuliginous steams, that are forced out of the whole circumference of the Body, in their turn cause the retraction or repercussion of the Belly and Diaphragm, in the *Expiration*; for its a plain and received Doctrine, that the motion of the Diaphragm, which is accounted a great instrument in Respiration, is as much natural, and more natural I may say, than it is spontaneous in Beasts and Infants, or voluntary in Men, and I do farther conceive, if there were no Diaphragm created in Men and Beasts, the ambient Air is sufficient, to set the wheels of the Lungs on going: For there are abundance of moving living Creatures or Animals, that do inspire and expire, on which Nature hath not bestowed a Diaphragm. So that the great use of the Diaphragm seems to me, to be an instrument of expulsion, in causing, or chiefly assisting to exonerate the Guts of its Excrements by Stools, the Stomach of its offensive contents by Vomit, and the Lungs by Coughing. It may be likewise compared to a *Flabellum*, or Fan, that moves

moves and ventilates all the internal Air contained in the great cavities of the Body. The motion of this internal Air, I do conceive, is as much assistant to the motion of the Spirits and Blood in the Arteries, Veins and Nerves, and to the peristaltic motion of the Stomach, as the Air and Wind is to the motion of the Sea, which latter the greater it is, the higher the Waves are moved. Secondly, Natural Philosophy doth Teach us, That as much Air as is inspired and admitted into the Body by the Lungs, so much Air must necessarily be forced out of the Body, to make way for its entrance, which plainly tells us, That the inspiration by the Lungs is the cause of an universal transpiration through the whole Body, and that the same ambient Air being lately squeezed out of the Lungs, must necessarily by inspiration return into the Body again, through the ambient pores, to make way, or else you must allow a *vacuum*, or void place in the Air, which is impossible; for a place (*locus vocatur, quia continet locatum*) is that which containeth and circumscribes something, and how can a place then contain nothing, which is a *vacuum*? Thirdly, I take the Diaphragm to consist of two Muscles, which appears plain enough in the dissection and narrow inspection of a Bullocks Midriff, whereof one is made use of in the dilatation, and the other in the contraction of the Breast; for its absurd to believe, That the same muscle can perform two contrary motions.

That no living Creature can subsist without the Air, and perspiration, is allowed by all, but for what Reason, or what use or benefit the Air doth afford, is only slightly asserted, viz. That it is for ventilation only, that is to say, it gently fans and moves the living Spirits, and therein assists them in separating Fuliginous, and

other Heterogeneous little Bodies or Particles, which otherwise would cloak, or suffocate the said living Spirits. In the same manner I do conceive, That the Air in ventilating the focal Fire, or any burning flame, doth assist its most subtil particles in separating and expelling fuliginous and other corpuscles, and receives them also in those places, which it (I mean the Air) leaves to fill the places, left by the said fuliginous and other corpusculs; so that a Fire or flame seems to be extinguish'd or rather suffocated, though want of Air, bycause it hath no places to dispose its fuliginous and other corpuscles into, and stands in need of its assistance for ventilation and gentle motion.

From this premised Discourse, I deduce these consequences to my self. 1. That upon the goodness of the Air (which consists in a just temperament, a due thinness, and clearness or purity) depends chiefly the Health and long Life of a Man. Too much heat, or too great thinness of the Air, moves the Animal Spirits too impetuously, and consequently disperses and consumes them, weakneth the Body, and hinders all Digestions, whence it is, that People are short lived, and weakly in the *Indies*; long lived, and strong in the *Northern* Climates. Frequently and gently moving, and oft changing the Air from one place to another, though only out of one room into another, seems to me to conduce very much to Health, bycause by those frequent removes you avoid inspiring the same fuliginous Air, which you do expire; on the other hand, they that live sedentary Lives, that are slothful, or much addicted to lie in Bed, are seldom Healthful, but commonly crazy, and dull in their senses.

2. If change of Air generally is of so great an Advantage, it is far greater, and consequently of

of necessity to those, that labour under any Distemper of the Lungs, or any kind of difficulty of breathing; so that I have observed, that many cannot be cured without change of Air, notwithstanding the assistance of the best and most proper Applications, which sometimes the Air alone doth Cure, and other times being assisted with very small Remedies.

3. That using of violent motion, and continued long, doth at last render the body Diseased, and is very contrary to Health; for it's observed, few of those are long livers.

4. I am apt to believe, That in the Air are contained most subtil corpuscles, that are homogenous to the Spirits, (though in some kinds of Air more, in some others less,) that nourish or multiply, increase, or are added to the Animal Spirits, whereby the Body is considerably strengthened. Lastly, I do believe, That the Air, or rather *Aether*, is the *Primum movens corporeum* of all living Creatures; for by inspiration the Air moves all the Animal Spirits, (as after my manner I have shewed before) which move all the humours and muscles of the Body. Take away the Air, and Life (which consists in motion of the Animal Spirits,) ceases at the very moment.

5. I should have inserted here an Observation of the Air, which in probability would put a considerable change to the Method of Physick in most Diseases, among some at least (as it doth in me) if not many; but having already discharged my self of what the Title Page promises, to the full, and this Treatise being swelled beyond my intention, I must supersede.

CHAP. XI.

Of the motion of the Blood, and the cause thereof, also of its quickness or slowness.

1. I Return to the Heart, which to me appears for use, like unto a draining Water-Mill, serving to throw off, and disperse the water to any parts, whither the Wheel shall cast, or direct it by its impulse; in like manner the Heart is an Instrument, whose principal Office is to throw the Arterial Blood to all parts of the Body; And as the spirituous and forcible eruption of Water out of a deep cavern of the Earth at the source or spring head, together with its being highest in situation, (in respect of the declination of those places, to and over which it's impelled,) is the cause of that motion, so the Brain may very probably be esteem'd the Source, as being the highest situated; whence the Animal Spirits do forcible rush out into the Chanals, Humours, and parts of the Body. Wherefore, I suppose the Brain and its Animal Spirits, in respect of the Microcosm, to be what the Sun and its Spirits, or Particles (being its Irradiations or Beams) are, that are distributed to all parts of the Terraqueous Globe, where Motion is perceived, penetrating to the deepest bottom of the Waters, and through the closest and most compact heap of Earth, into its Bowels, where Metals and other subterraneous Bodies are engendered. In like manner do the Animal Spirits penetrate from the highest part of the
Body

Body to the extreamest parts, as Toes and Fingers, which the sense of Feeling doth attest to us; and likewise to the deepest parts of the Bowels. I do not imagin, that the Animal Spirits being transmitted through the Nerves, must arrive to the extremities of them before they can be dispers'd to all the circumjacent parts; but that the Nerves are pervious throughout all their extent, with laterial pores, or minute Channels, through which they burst out in their descent. giving motion to all parts moveable. Neither do I believe there are any Vital or Natural Spirits (as they are commonly term'd) but they are all Animal Spirits (though in a greater Propotion in the Arteries than the Veins,) that occasion the Blood to circulate; for to me it appears improbable, that the motion in the Arterial Blood should cause the Blood in the Veins to move at so great a distance from the Heart, when necessarily their motion must be spent at the Capillars, if the force of motion in the Arteries, be by experience found to be less and less, in proportion of its greater distance from the Heart. But that the same motion of the Arteries should cause the motion of the Animal Spirits, seems to me much more absurd; for the Animal Spirits being incomparatively more subtil and infinitely stronger and more forcible (as appears by moving all the Joints together with the whole Body) can in no manner be conceived to be moved by Vital Spirits, that are much more gross, and of so little force, that they cannot make the least impulse upon them. if these Maxims be true, that *Entia non sunt multiplicanda præter necessitatem*; And *In omni genere oportet ut sit quiddam primum*; *Principium numeri est unum, & omnes numeri consistunt ex uno*, (or if I may so say) *DIVERSIS UNIS*; The Brain doth justly challenge the dignity of being the

the first and sole principal part of the whole Body, having an absolute Empire and Command over all other parts, performing by its Animal Spirits all the Motions, Functions, Actions and Offices of, and in every Bowel, Humour, and all other subservient Parts, which are only Instruments, that modify and determine the said Spirits. This whole premis'd Discourse is plainly proved to me, by this sole Argument. The whole Body of Man is created for the external Sences and local Motion, and these for the internal, *viz.* Understanding, comprehending humane or rational Imagination, common Sense, and Memory, which are only three distinct Acts of one sole and chief Faculty of Understanding; of which, the Brain is the Seat, and the Animal Spirits the Instrumental Cause; so consequently all the Parts of the Body must be created, to be subservient to the Brain and its Animal Spirits. Secondly, That the Animal Spirits do move the Arterial Blood, and the Heart, is clearly evinc'd by the Observation of Passions. The Sight, or Hearing, perceiving any dangerous Object, conveys it to the understanding Faculty in the Brain, which by retracting its Animal Spirits, doth at the next instant, cause a slow languid motion upon the Blood, and Heart, and sometimes wholly stop it. On the other hand upon perceiving a pleasing Object, a crowd of Animal Spirits is impelled into the Blood, which immediately occasions a quicker and more lively motion in the Blood, Heart and Arteries, as may be felt by their pulsation. An injury being done to a Person, the Report of it is by the external Sences carried to the Understanding, which judging it to be such, immediately stirs up the imagination, that at the very instant makes a forcible impulse upon the Animal Spirits in the Brain, which propagate that

that impulse to and upon all the Animal Spirits throwout the whole Body, as well upon those that are perfused through the Arterial and Venal Blood (whence happen those strong and quick Pulses) as upon those, that fill and rarefy all the Muscles in the Body, especially those of the Joints, that are to execute the revenge; from this great commotion, ruffle and rarefaction of all the Animal Spirits in the Body, is to be derived the Swelling, Firy red colour in the Face, and the Swelling of all the Body, whence People are apt to say of an angry Man, that he swells like a Toad. So that the attributing of the immediate cause of anger to Choler, must be a mistake (whence angry Men are call'd fullen) of all Ages to this Hour; For Melancholic, Phlegmatic, and Sanguin Men, are all subject to be moved to anger; besides the Choler or Gall, that is in the Gall Bladder and the *porus biliarus* cannot regurge into the Blood, being hindred by the valves, that open towards the Guts; unless it happens, that those fibres of the valves are convelled by a violent Death) as in a slaughter'd Ox) then the Gall is oft thrown back into the Liver, as you may perceive in many Bullocks Livers. True it is, those yellowish cholerick Persons, whose Blood is perfused with more subtil and moveable operating Spirits, are most prone to anger, or quicker stirred to it, whereas Melancholians, whose Blood is more heavy, thick and saline, are not so prompt to fall into that sort of Passion; but when by repeated provocations their Salts are subtilized, and their Animal Spirits are grinded thinner, then they fall into a much more furious anger, and of a much longer continuance. Whence it appears. 1. That the Seat of Passion is in the Brain, and not the Heart, 2. That the Animal Spirits are perfused thro' all the Arterial, and consequently Venal Blood. 3. That nothing in the Body, doth move so swift as the Animal Spirits, 4. That the whole Body is
pervious

pervious with Pores, and most subtil Chanals, of various Figures and Dimensions. *Mercury* by external unction, or fumigation, is let into the Body, through the ambient external Pores, even to the Bowels, and the Brain it self, though applied never so remote. *Aloes* by friction about the Navil, or any part of the Belly, passeth through the Pores to all the circumvestient Membranes and Muscles, until it arrives to the Guts, where it moves Stools, kills, and expels Worms. *Tabacco* applied to the Wrist, by penetrating through the external Pores to the Vessels, Humours and Spirits, by circulation reaches the Stomach, provoking it afterwards to Vomit, and in some Bodies violently enough. *Cantharides* externally applied commonly cause sharpness of Urine, and sometimes bloody. Opiated Unguents, though applied to the Soles of the Feet, soon reach the Brain. On the other hand, I have oft observed the scent of some Medicines, which I used to give in Venereal Distempers, to pass through the Body to the external Skin, that always prov'd a certain sign the Patient would be cur'd. By all which it appears, that those foremention'd Externals were impell'd through the ambient Pores, by the Air lately expir'd, and crouding into the Body again, at the next inspiration, and that those Antivenereal Medicines were driven out of the Body to the circumferential parts, by the Air expiring. 5. That the Heart is not a principal part of the Body, but an instrumental and subservient part. 6. That the Animal Spirits are *Toti in toto, & toti in qualibet parte*, performing, as I said before, chiefly and principally, as the sole primar, efficient Causes in all the Body, and in every part thereof, all the Offices, Functions and Actions, except the Rational; wherein they are only Instrumentally subservient to the *Anima Rationalis*. I must confess, that this Paragraph

graph is not very Philosophically expressed, neither am I endu'd with Sense enough to defend it from all Objections, and seeming absurdities, and therefore ought rather to be referr'd to Metaphysics, or a *Credendum*. 7. It also follows, that we need give no greater respect to *Cordials*, then to *Hepatics*, *Pulmonics*, *Splenetics*, or to any other appropriated Medicines; but the chiefest and principal Medicine ought to be reputed a *Cephalic*; so that instead of saying *per Excellentiam*, this or that is a *Cordial*, we ought to say it's a *Cephalic*; for all those that are commonly called Cordials, are no other than true *Cephalics*, and no otherwise helpful, than by relieving the Animal Spirits, and comforting the Brain and Nerves. Moreover, all the Hypochondriac and Hysteric Symptoms, as Palpitations of the Heart, various Pulsations, sometimes slow, quick, low, or intermittent, Faintnesses, Swoonings, faint Sweats, Convulsions, swimming in the Head, (*Vertigo*) choakings in the Throat, stifled, difficult, oppressed, and insensible low Breathings, frequent Sighing, tottering weakness of the Joints, desponding sorrowful thoughts, Urine sometimes as clear and limpid as fair Water, other times white, turbid and muddy, sometimes high coloured, other times pale; Gripings, croaking and thundering Noises about the Bowels and Guts, Vomiting, and sharp continuing pains at the Stomach, Belchings, Yawnings, Dimness and recurring darkness of Sight, (*Scotomia*) noise in the Ears, creepings between the Skin, Crying or Laughing, or maddish Passions, besides many more, are all Symptoms of a diseas'd Brain and Nerves, preternaturally affected, and discomposed or vitiated Animal Spirits, and are relieved no otherwise, than by Medicines, that relieve and operate upon the Animal Spirits, and immediately by them upon the Brain and Sinews; such are chiefly oleaginous volatil Spi-
rits

rits, and more especially those that consist of a penetrating durable Sulphur or Oyl; for if they are only Volatil Spirits, (tho' in that form they are experimented to be very helpful) they exert, lose, and spend their Virtue before they can arrive to the Brain; and therefore its necessary they should be oleaginous and sulphurous, and consequently more lasting. It is also found experimentally, that gentle Narcotics have a great influence, in suddenly suppressing all those recited Symptoms; which being universally owned to operate only upon the Animal Spirits, Brain and Nerves, is a manifest Argument, they are occasioned by an ill affected Brain, and Vitious Animal Spirits. All these prenumerated Symptoms do accompany a preternatural affected Brain, and must be acknowledged to proceed from vitious Animal Spirits, *viz.* Convulsions, tottering weakness of the Joints, sorrowful Thoughts, dimness of Sight, noise in the Ears, &c. excepting Palpitations, intercurrent and various Pulsations, which cannot be thought a Primary, but a Secondary (*per deuteropathiam*) Affection of the Heart, occasion'd through the Vitiousness of the Animal Spirits, stimulating, or othertimes retarding the Fibres of the Ventricles, and Valves of the Heart in their motion. How and by what means the Animal Spirits may be vitiated, either by the ill mixture of the constituent parts of the Blood, and its impurities, and commixtures with adventitious, or other noxious Particles, will take up more room to explain, than I purpose to allow here in this small Volum, which otherwise may easily be rendr'd intelligible, or applicable by every Judicious Reader in Physick, and therefore I shall forbear any further Discourse about it. 8. To corroborate my Assertion in the preceding Paragraph, *viz.* That Cordials ought rather to be called

called *Cephalics*, may be plainly deduced from the sudden relief, Patients in Swoonings and Faintness do receive, from the scents of Spirits of *Sal Armoniac*, of *Hartshorn*, *Cranium humanum*, *Sanguis Humanus*, of *Galbanum*, *Assafetida*, and the like; also from the friction of the Temples, with the thinner spirituous Oyl of Amber, which being admitted into the branches of the Carotidal Arteries, are convey'd to all the parts of the Brain, where they rouse up, quicken and stimulate the Animal Spirits, and disentangle them from any adhering offensive Particles, whereby the Patient being suddenly revived out of his Faintness, and Swooning, and the inordinate pulsation of the Heart reduced, is a manifest proof, that these Symptoms commonly are not depending upon any Primar affection of the Heart, but upon the disturbance of the Animal Spirits. 9. Many have been much puzzl'd in some doubtful Matters relating to Infants in the Womb; as whether in that Station they have Respiration, and whether their Heart and Arteries have Pulsation; and consequently, whether the Blood in the Infant doth circulate, and whether the Animal Spirits exercise the same Functions, which they do after it comes out of the Womb. I do conceive, the Infant, as long as it continues in the Womb, doth only live the Life of a Plant, and is like to a Sucker that receives its Growth from a Tree, in receiving its Neutriment and Augmentation from the Mother: It hath no Respiration, or as little as can be imagin'd; and consequently, that its Heart and Arteries do not undergo any Pulsation; neither doth the Blood circulate in its Vessels, nor do the Animal Spirits perform those Functions they are intended for after the Birth of the Infant. The Parts of the Infant in the Womb lying so compact and close, and every place

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fill'd up with Humours, Excrements and Internal Air, there is no room left to admit Air from without; especially being enclosed by two thick Membranes, and a surrounding Moat of Serous Humours: It being the External Air forcing into the Lungs is the chief Cause of Inspiration and Expiration, as I have expressed before, that being excluded, there can be no Respiration in the Infant in the Womb. What I have to say concerning the Manner and Causes of Pulsation, may be best understood by a Comparison to the Sea; which (though it be in the calmest Season) is subject to heave up and sink down, or to be dilated and contracted, as appears by its Waves, which is not unlike the Pulsation or *Diastole* (Dilatation,) and *Systole* (Contraction) of the Heart and Arteries. The heaving up of the Sea I will only suppose to be caused by an Expansion and Rarefaction occasion'd by the motion of the Salin Spirit of the Sea, of which it may be thought very pregnant by the strong Smell (being *a parte Objecti* the Salin Spirits acting upon or vibrating the Olfactive Organ) of Sea-men's Cloaths, and other things. The Air being crouded or condens'd by the swelling of the Waves, forces them down again by the Inclination it hath to recover its former place: In the same manner I do conceive, that the Animal Spirits, that are copiously perfused through the Arterial Blood, do expand, dilate, and rarefie it, which causeth the *Diastole* or Dilatation in the Heart and Arteries, whereby the Air that is entred by inspiration into the Lungs and all other Ambient Parts of the Body, and fills all the Pores that are capable to receive it, is condensed and crouded, but relaxing, beats back the Sides of the Heart and Arteries, which being streightned, and having an Inclination to return, do then occasion the *Systole*

Role, or Contraction. The fore-mentioned Comparison differs in this, that the Arteries are moved continually, in Contraction and Dilatation, throughout their whole length, reciprocally, all at once; whereas the Sea is moved into innumerable discontinued Waves, that are lifted up and fall again at opposite and different times; while one Wave rises, the other falls. To which I can only answer, Were the Sea coated about with a thick strong Coat, as the Arteries in proportion are, all the parts of the Sea, or the whole Surface, would be uniformly heaved up at one and the same time, and fall in the same Order, as the Arterial Blood doth in Pulsation.

2. This Hypothesis (how probable soever, or true seemingly it may be, I will not discuss at this time) implying the Necessity of Admission of External Air to cause Pulsations, explains that the Heart and Arteries of the Infant in the Womb do not pulsate regularly, or orderly; neither do I doubt, but that the Animal Spirits do in some-wise move the Blood, (which else by Stagnation would be Subject to Putrefaction,) though not to circulate. And here a Question may be moved, Whether the Blood in its Circulation, or passing out of the extremities of the Arteries, into those of the Veins, is pressed out by the Rarefaction and Expansion of the Arterial Blood by the Animal Spirits in the *Diastole*; whereby taking up more room, and as it were overflowing, is squeez'd out; or whether it is forced out by the vigor of the Animal Spirits, and the Compression of the Arteries in the *Systole*? But then another Question must follow; How, and by what Force is the Blood moved in the Veins, where there is no sensible or manifest Pulsation? For to say, that 'tis the Force of Pulsation doth move it out of the Extremities of the Arteries, into the Extremities of the Veins, through the

fibrous, intercurring, most minute Passages, or Pores, by Pulsation, or rather Protrusion, or thrusting forward, must run us into great Difficulties, if not Absurdities. For, *First*, Considering that the Force of Pulsation or Protrusion must be extreamly abated in the aforesaid Extremities of the Arteries, and more in the Intercurring Passages, and yet more in the Extremities of the Veins, which suppose in the Toes, can you rationally imagine, that the Force of Pulsation, that is so very much diminish'd, if not wholly extinguish'd, can be sufficient to force and thrust forward through so great a Length (as reaches so far a distance as the Heart) so great and weighty a Mass of Blood, which it must by Process encounter with in the bigger Veins, besides the Resistance it must meet with in the several Meanders, Turnings and Windings, and a great many Valves (making a great Resistance) of the said Veins, that will still yet more deaden the Force of Protrusion; and yet more, if the Body by straightness of Cloaths, or lying upon one side, suffer a Compression and Narrowness in the Veins and Arteries? *Secondly*, Suppose the left Ventricle, when filled, to contain two Ounces more or less of Blood (according to the Opinion of some Anatomists) in a Heart of a mean Size; and that, according to the same Opinion by every *Systole* the said two Ounces are with a violent Explosion, as if it were with a Spring thrown into the Arteries, it must follow, that by every Pulsation so much is receiv'd and impell'd into the Veins, which being destitute of a forcible Pulsation to return it to the Heart, cannot possibly in the same length of time discharge it; especially, the Blood being now grown more condensed, incrassated, more fibrous, less spirituous, and possibly from a lower to a higher place, and through all the Valves, which, as I said before,

fore, make a very considerable Resistance. If then the Veins cannot receive so much Blood, as is thought to be propelled by two Ounces at a time, by every *Systole*, when probably they cannot receive a Dram or two at most, at every *Systole*, what must become of the remaining Fourteen or Fifteen Drams, that are by every Pulsation thrown out of the Heart?

* *Abating so much Arterial Blood as is taken up in the nourishment of the parts, and in the supply of matter for Animal Spirits.*

* It must either return, and regurgitate into the Heart; upon which either an intermittent Pulse must follow, or a total Stagnation, and consequently Death. In short, to make the Veins capable of receiving as much, as by Pulsation is thrown out of the Arteries, you must grant as rapid a Motion, or flowing in the Veins, as there is in the Arteries, which all that have the least Sense must deny; for the Blood in an *Arteriotomia* doth spurt out of the Arteries with ten times the force, and in ten times the quantity, in the same proportion of time, and consequently is moved ten times swifter. It must then follow, that in every *Diastole* the Ventricles of the Heart are either not quite filled, or not entirely emptied in every *Systole*, which I do verily believe is so. By what is here discoursed, it appears, that very oft the cause of an intermittent Pulse is the incapacity of the Veins, by being obstructed in some place or other, to receive the proportion of what is thrown into them by the Arteries; and the cause of an universal Stagnation may be thought too great a Repletion in the Veins, wholly excluding the Reception of any Blood from the Arteries.

3. Should it be allow'd, that the Heart by every *Systole* throws two Ounces of Blood (which some do assert the left Ventricle to be capable of containing;

containing) into the Veins, and that they receive it; then it will follow, that reckoning only 500 Pulsations in a quarter of an Hour, there must be circulated fifty Quarts; and consequently, that the whole Mass of Blood, or all the Blood that is in a moderate Man's Body (which is thought to contain from Eight Quarts to Twelve, according to the greater or lesser quantity of the fullest, or thinnest of Men, being in Health) must be circulated or moved round from the Heart, through the Arteries into the Veins, and thence into the Heart again in three or four Minutes, and about a Pint every eighth part of a Minute, which must require a Motion more rapid, and a greater noise, than the *Thames* under *London-Bridge*. Such a career in the Blood must be suppose to make more way in fewer Weeks, than the Sea and Wind together do, in carrying a Ship to the *East-Indies* in many Months. Besides, such a violent Motion would not only burst the Veins, and break the Fibres of the Blood, but churn it into red Butter, and blue Butter-Milk. Moreover, Motion causing Heat, such a Violence would immediately put the coldest *Icelander* into a burning Fever. It is observ'd, that the too violent and quick Motion in a continual Fever, makes a separation in the Blood of the Oily sulphurous parts, swimming on the serous, not unlike Milk, which the violent and quick motion of the Churn separates into Butter, and a thin serous curdy Milk.

4. That the Ventricles of the Heart are not fill'd by every *Diastole*, nor quite emptied by every *Systole*, appears plainly in *Hypochondriacs*, and *Hysterics*, who sometimes having a large, high, and quick *Diastole*, (as may be felt by feeling the Pulse of the Wrist) and a low, straight, and slow *Systole*, shews that the taking in must be more than the going out. Soon after the *Diastole* is changed

chang'd from large to low, small and slow, and the *Systole* quick, which signifies a lesser Repletion of the Ventricks, and consequently, that they were not fill'd as before. What can you think of a Vermicular Pulse? Here you must allow, that the Ventricks are far from being fill'd in the *Diastole*, or emptied in the *Systole*. I foresee, that it may be reply'd, that notwithstanding the Pulses do vary from large and full, to narrow and small, the Ventricks may be filled, bycause, in those narrow low Pulses, the sides of the Ventricks do fall, and then consequently may be fill'd accordingly: That is to to say, the Fibres of the Heart are relaxed, and so the Ventricks must fall into a narrow compass, like unto a Bag that's empty, for want of something to fill it; but then, still its a Sign they have a capacity of being fill'd, which they are not by every *Diastole*, as I have shew'd before.

5. From this premis'd Discourse it must necessarily follow, that the influx of the Blood into the Ventricks, is the cause of filling them more or less, according to the proportion of the Blood flowing in, and consequently to that, that it's the Blood moves the Heart by Rarefaction and Stimulation, according to the proportion of the Quantity, and Quality of the Animal Spirits it's repleted with. If the Blood be thick and gross, for want of Animal Spirits to rarefy and move it, the *Diastole* must necessarily be slow and low, bycause the Blood through its thickness cannot enter into any great quantity, nor stimulate; if it be thin, much rarified, and full of good Animal Spirits, the *Diastole* must be large and high, and if very stimulating, quick. So that the variation of Tunes of all the Pulses must be caused, in my Opinion, by the quantity and quality of the Animal Spirits, and the Blood; and the causes of Stagnation, intermission of Pulses, and several o-

ther Affections of Pulses, of Apoplexies, and abundance of other Difficulties cannot so readily be assigned, and Reasons given thereof, but by supposing only (though it were really otherwise) that the influx of the Blood is the moving cause of Pulsation, and not the Heart, which notwithstanding all Objections, whereof in the next Paragraph I shall recite the chief of them, I do believe to be true,

6. That a Muscle is the cause of Motion, its vulgar Definition, or rather Description doth imply. *A Muscle is an Instrument of voluntary Motion*, which seems to overthrow, what is by me asserted for a Supposition, on which the preceding Discourse of the cause of Pulsation doth depend; and consequently that the Heart being a Muscle, must be the cause of the motion of the Blood, to which I do answer. That the Heart cannot properly be term'd a Muscle, because its Motion is not Voluntary, as must be own'd by all, but Natural; and if so, must be moved by an Extrinsic (in relation to the Heart) moving Cause, which can be no other than the Blood and the Animal Spirits, wherewith it's repleted; for *Quicquid movetur, movetur ab alio*. True it is, the Fabrick of the Heart is very like to a Muscle, I should rather say to a two-fold Muscle, whose Fibres consisting of two different Orders, Positions, Figures, and Disseminations, do both meet in the Cone, exactly resembling a two-fold Tendon, though far from being a real Tendon, either in the Texture, Toughness, or in its Office, which is to be subject to local Motion at the pleasure of the Will; whereas the Motion of the Heart is purely Natural, and caused by the Blood, and the Animal Spirits rarefying it. Besides, there is a great difference in the Figures, which are streight, and terminate where they are inserted; whereas the nervou Fibres that meet about the Cone of
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the Heart, are not streight, but posited Oval, that is coming down, and returning again upwards in an Oval Figure ; so that one Muscle (that is to say nervous Fibres disposed in Muscular Positions) seems form'd for Dilatation, or opening, to admit the Blood ; and the other for Contraction, or shutting out, or discharging of the Blood, both these Analogous Muscles receiving their Animal Spirits from a Branch of the Sixth Pair.

7. Touching the motion of the Blood in the Veins, which to me appears, cannot be caused by Pulsion of the Arterial Blood, as being moved incomparatively slower, by reason of its consisting of thicker and grosser parts, and fewer Animal Spirits, and being much hinder'd by the Valves, breaking the force of its motion, which said motion I do suppose, is caused by rarefaction of the Blood, through the continual and forcible agitation of the Animal Spirits, by which means it's squeezed or pressed forward ; and furthermore I am apt to think, that there is a kind of pulsation in the Veins, but so weak and low, that it's scarce perceptible. It is likewise my Opinion, that the local motion of all the Humours, whether natural, or preternatural, or excrementitious, is caused by rarefaction, Before I leave this Subject, I think my self oblig'd to let you know, I am not so forgetful, as not to remember that in some former Writings, I have set down some Opinions much different, and others contrary to these I have now declar'd, being misled by commonly received Sentiments of the Learned, and now (as I do believe, for I shall scarce be ever positive in any thing) better inform'd by many Experiments.

C H A P. XII.

Of Celebrated Remedies against Consumptions.

FOR the present I have detain'd the Reader long enough in Theoreticks, I will now make bold to offer some Observations on the Practick, the Vanity whereof in many particulars appears to me very extravagant: And in regard I would avoid being troublefom, I shall only make choice of those Diseases, that are most univerfal, and begin with *Consumptions*, I mean those that are occasion'd by an Heetick Fever, and attended with a chronical putrid Cough; namely such as is caus'd by a putrid slime, and sometimes accompanied with an Ulcer in the Lungs, known by purulent expectorations. I will not undertake here to enter into any Discourse of the Causes, and Indications, that are to be drawn thence, but only recite such Remedies, to which many do attribute great Virtues, and make appear, how vain, fruitless, and deceitful they are. By the way let me tell you, there are many Consumptions, that may properly be so call'd, that are neither occasioned nor accompanied with an Ulcer in the Lungs, but sometimes in the *Bronchia*, othertimes in the *Asperia Arteria*, and sometimes with no Ulcer at all, but very oft with an ulcerous putrid slime only. Passing by the gentle Purgatives, as *Cassia*, *Rhubarb*, &c. that may be necessary in the beginning, and sometimes in the Progress; I shall only examine the Remedies, that are so highly recommended against

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Ulcers in the Lungs, and ulcerous Coughs of Consumptions.

2. *Syrup of Turnips* is a very celebrated Remedy here in *England*, and no where else; which after it had been used by many in proportionable quantities, at seasonable times for three Months successively, they have notwithstanding all its Praises, gone off, without the least abatement of their Coughs, or improvement in their habit of Body. Neither can I any ways discover, whence those pretended Vertues should proceed, or in what part of the Turnip its wonderful strength doth lye. It's apparent enough, that the expressed boyl'd Juice is waterish and windy, not nourishing nor absterfive, neither hath it such a cooling quality, as to have the least prevalence in abating the Hectic Fever, so that I do look upon it to be a foolish vain Medicine. True it is, that the Sugar in it may seem to allay the salin slime, smooth, and lenify the Gullet, which upon this occasion is ever very rough, and so in some measure seem to ease that part for a little time; but after it hath been some little time in the Stomach, turns into a very sour, piercing and almost corroding moisture, which allowing after some considerable time it doth arrive to the Lungs and Wind-pipe, must under those qualifications render the said Parts more rough, and rather provoke than in the least abate the Cough.

3 But *Ground Ivy* alias *Ale-booff*, alias under several other Names, is the *Catholicon* of the Vulgar, and of many Physicians also, who appropriate it to the Eyes, Kidnies, Bladder, Lungs, and to the cure of internal and external Ulcers, proclaiming it the chief of all Vulneraries. These singular Commendations do incourage many to use it in all their ordinary Drink; some for to cure and preserve their Eye-sight, others against the Stone, Gravel, Hypochondriac Vapours; and in Consump-

Consumptions supposed to be caused by an Ulcer in the Lungs, it's entertain'd for a None-such. *Quercetan* the *Armenian* gives you his Word, that with the Juice of it boil'd into a Syrup with Sugar of Roses and penid Sugar, mix'd with Flower of Brimstone into a *Loboch*, he hath recovered many desperate Consumptives, who either in my opinion, were not in a proper Consumption, or Chymist like, boasted of what he never observ'd. All those eminent qualities of this Ground-Ivy, are supposed to flow from a diuretic and absterfive Virtue, as most Traumaticks are thought to do their feats by. But where this subtil Spirit, or bitter Salt is to be found, I am yet to seek. I have sundry times advis'd it to Consumptives, to be used sometimes singly in a Syrup, other times join'd to *Bugle*, *Speedwel*, *Sanicle*, *St. Johnswort-Flowers*, *China-root*, (and sometimes *Sarsaparill*) *Dates* and *Liquorish* boil'd to a good strong Decoction, to be sweetn'd with Sugar of Roses, and taken at *Horis Medicis*; besides, a smaller Decoction made with the addition of a few fresh Ingredients, to be drunk at other times. This though used ten or twelve Weeks successively, with a good Barly Broath and Milk Porrage Diet, I have observ'd to be as ineffectual, and unsuccessful, as all of the other celebrated Remedies I shall hereafter mention. True it is, that many youthful or otherwise strong Bodies, that have been molested with a long strenuous Cough, copious and foul Expectorations, so as a sensible wasting of the Flesh and other parts hath ensu'd, have been restored to Health, upon Pectoral Syrups, and Decoctions made after the forementioned Model, whence to those Remedies the Titles of *Infallible* and *Sovereign* have been attributed, whereas the Disease was not accompanied with an Ulcer in the Lungs, or an Hectic Fever, but remov'd by sparseness of Diet, and possibly change

of Air, so that not the least advantages have been derived from these Pectorals, but rather a detriment, if you will with me believe, that all Sugars and sugared Medicines turn sour in the Stomach, and assume a sharp fretting, and sometimes corroding quality. Is it not a daily observation, that many Persons of the best Quality labouring under a Consumption, whose Fortunes do enable them to be assisted by a Chorus of Physicians, performing their utmost endeavours, by prescribing all the noted Pectorals, maugre all their useles Efforts, are forced to yield to the fury of their Distempers? However, take notice, that I do not offer this sort of Discourse, to discourage any Consumptive from applying to a Physician; for considering, one so Diseased is under a Sentence of Death, and to continue so, is to dye every Day, every Week, and every Month, which is more terrible than a Pestilential Fever, whereof a Man dieth but once; the advising with a Physician who shall give you hopes every Day, Week, and Month, of recovering of you, will wholly abate your Terror, until the very Moment you leave him, and he leaves you.

4. *St. Johnswort* in its Flowers, under the Notion that it's one of the chiefest Traumatiks, having by infusion in Water, Mead, or small Ale, and a little boiling towards the latter end, impregnated either of these Liquors with its Virtues, and with Sugar, or rather Honey reduc'd into a Syrup, is by many approv'd very soveraign to Consumptives; the Truth whereof can be best attested by several, that have used it several Weeks to no purpose.

5. Among all the decanted Remedies against Consumptions, I find Physicians have a great respect for *Sugar of Roses*, and for being a kin to that, for *Conserve of Roses*; of which former, it is the Report of *Avicen*, that a certain Woman, who

who was in a desperate Consumption, was not only recovered by it, but made fat thereby; add here unto a concurring Testimony of *Mesuer*, that many have been cured by it of Consumptions, that being no less recommended to them than the latter, viz. *Conserve of Roses* by *Montanus*, *Valleriola*, and *Forestus*, who pretend abundance to have been cured by using vast quantities of it; and *Rivcrius* tells you likewise, that he knew an Apothecary, that was cur'd of a Consumption, only by almost continually eating *Sugar of Roses*. On the other Hand I am well assur'd, that most practicing Physicians, if they are pleas'd to speak the Truth, can tell you, they have known hundreds of Consumptives, that have used it in gross quantities, without the least benefit: As for my own particular, I am so far from believing, that any Consumptive, to whom at any time I have advis'd it, upon the credit of the forementioned Authors, have receiv'd any advantage, that they rather were rendr'd much worse by it: And my Opinion further is, scarce any thing is more unwholesome than Sugar, whose greatest use is to please the Palates of Women and Children, and to preserve Fruits and Herbs from corrupting. It cannot be denied, but that eating much Sugar destroys the Appetite, by raising Fermentations and Ebullitions which extremely annoy Digestion; sometimes causes Loosenesses, Fevers, ill habits of Body, &c. and is no ways Pectoral.

6. Of all Sweets, nothing is more Pectoral than *English Liquorish*, and its Juice; and if it be true, that most Countries afford a native Remedy for endemick Diseases, they are Subject to breed, *Liquorish* may very well be accounted as such in Coughs, and those Diseases of the Breast.

7. We are then to consider the *Conserve*, and *Sugar*

Sugar of Roses, to be Intended only as preservers to the Flowers, and their Juice; and therefore the principal Virtue must reside in the Juice; and how far that is Pectoral, or absterfive to the Ulcers in the Dungs I cannot well apprehend, especially if it be said to be drying, binding, stopping, restraining, and consolidating, which most certainly are Qualifications contrary to smoothing, or absterging; for what is binding and rough, must cement, thicken, detain, bind and fasten the putrid matter in the Lungs, and entirely hinder and stop up the Expectoration, either of purulent matter, or putrid slime. So that I cannot conceive those Authors recommended these Rosie Remedies against Ulcerous Consumptions, but only against such as they supposed to be occasioned by a Catarrh from the Brain of thin saline Rheums upon the Lungs, which the drying and constrictive quality of the Roses might thicken, and by straightning the Passages, put a stop to the Catarrh. That humours falling upon the Lungs do cause a Cough, cannot be apprehended; for being without sense, and having no Nerves disseminated through them, are not capable of being stimulated into a Cough; so that what ever is conceived to occasion a Cough, must be something annoying and stimulating of the *Bronchia*, or Lung-Pipes. Neither is it probable there can be any Catarrh fall from the Brain, that being shut up as close in a Box by its Membranes, and Bones of the *Cranium*. Wherefore those Rheums can only be thought to drip out of the Glandules of the Throat, and *Aspera Arteria*, upon which those astringent Medicines do seem to have an Influence.

8. Certain it is, that such saline Rheumatick Constitutions are very subject to be extremely emaciated, against which its no wonder, if a Diet of Asses, or other Wheyish Milk, together with

with their *Hordeana*, and *Amygdalata*, Snail Waters, Decoction of Snails, Lobsters, and yellow Saunders, proved such Auxiliary Remedies; though I can never believe these Earth-Worms, Snails, Claws of Lobsters, (whereby, as *Cardan* doth write, he hath cured many desperate Consumptions, to whom, being more an *Italian* Romantick Astrologer, than a Physician, little credit can be given.) Syrup of Comfrey, of Milfoil, Bugle, and the like, they being all thickeners, ever cured the least Ulcer in the Lungs but may cause one.

9, Much less can I believe that ever *Eraſtus*, *Fracaſtorius*, and other *Italian* ſubtile Fourbs ever cur'd ſo many Conſumptives (as they pretend more out of a decoy to allure Patients, than a real Truth) with a decoction of *Guaiacum*, who probably were macerated by a Pocky Conſumption, which is ſo Epidemick among them, and no leſs Endemick, being the place of its Nativity.

10. Some are ſo void of Senſe, to approve of *Spirit of Sulphur*, or *Vitriol*, given in four or five drops, in a ſmall Glaſs full of Plantain, or Roſewater.

11. The Nacotick Thickning, and Emplaſtick Powder of *Hali Abbas*, conſiſting of the Seeds of white Poppy, Cucomber, Melon, Citrull, Quince, Gourd, Procelane, and Mallows, Gumarabick, Tragant, Starch, burnt Ivory, Juice of Liquoriſh, Penid Sugar, is a meer heap of Rubbiſh, by which *Velaſcus de Taranta*, and *Foreſtus* do each affirm, to have cured a ſingle Patient of a proper Conſumption; but ought not to be credited, that probable being only an Emaciation from ſuch a Cattarrh of a ſaline Rheum, as is before mentioned; notwithſtanding this Powder is ſtill in great eſteem among many Phyſicians, who never yet obſerv'd their Patients receiv'd any great benefit by it.

13. An *Elixir Proprietatis* tartarised, and so prepared, as to be very little bitter, and not laxative used in a Decoction of Mallows, or Marsh-Mallows in Whey, Mead, or very small Ale, is a Medicine far more commendable than any yet proposed. But the most proper Remedy I could hitherto yet discover, is a subtil penetrating Balsamic Tincture, taken in a true Pectoral Decoction for a Month, or six Weeks.

14. As for *Asses Milk*, it is rather a Medicinal Diet, than a proper Remedy; and, as I said before, by diluting and nourishing is helpful to salin emaciated Bodies, and to ulcerous Consumptives also, though if it ever singly cured one such, it hath fail'd a thousand times in others.

15. *Sulphur*, though indued with an extraordinary Virtue against all internal and external Ulcers, is not to be understood as such, being exhibited in Substance, whether in Flowers or otherwise, but ought to be dissolved and open'd by a proper *Menstruum*.

16. Before I conclude this Chapter, I can scarce pass by an Observation upon some deceitful Empirics, who after Patients have labour'd a long time under a proper Consumption, and a tedious fruitless cure of Physicians, have found a way to let themselves in by a specious Promise, accompanied with a large Declaration of bombast Words, that they shall be cur'd in six or eight Days, by only administering some common Pectoral Julep, or Apozem, proportionably enforc'd with *Diacodium*, or *Laudanum liquidum*, by which, on a sudden procuring rest, abating the Cough by suppressing Expectoration, and through those Narcoticks putting a stop to the violent motion of the Animal Spirits, (into which they are irritated by the pungent Purulent, or putrid slimy Matter adhering to the *Bronchia* or sides of the *Aspera Arteria*; for according to what I

have

have observed before, the Animal Spirits are the sole cause of all motion in the Humours) the Patient hath seemingly been wonderfully recover'd, and felt himself at a great deal of ease, though in effect, this way of proceeding did considerably hasten his Death, (by locking up the Matter) which though hapning so suddenly, the Empirick notwithstanding finds a way to get great Reputation by it, only by telling the Standers by, that they may plainly observe by the great Benefit the Patient received in so little time before his Death, that had he been callen sooner, in all probability, as they may judge themselves, he might have cured him. Among the rest of those Quacks, I knew one, that by many was called the *Consumption-Doctor*, who did confess to me, that his usual Medicine was what follows: He took, of *penny-royal-water*, and *Scabious water*, of each half a pint, therein he dissolved of *Oxymel Simplex* (and sometimes *Oxymel scilliticum*) four Ounces, and as much of *Diacodium*, which made a thick Julep, or a thin Syrup; hereof he would cause the Patient to take four or five Spoonfuls three or four times in a day. This was the same Person, and the same Medicine, by which he pretended to have cured one Captain O'Brien of a Consumption, which at that time made a great noise, and was taken notice of by His Majesty King Charles, as the Treatize, which was written upon it, mentions; though at the same time, you are not to conceive this Patient to be otherwise troubled, than with a long Chronical Cough, occasioned by Debatches, being without an Hectic Fever, nor having his Lungs toucht in any sort, of which, and his Leanness, he was rather recovered by the continuance of a Milk-Diet, and his detainure from Brandy, and other strong Liquors, which had caused this Distemper, though the giving season-
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able Rest to his Animal Spirits by the said Narcotic did also in some measure contribute to it.

17. Air being the life of the Lungs, a Consumption cannot be hoped to be protracted, or palliated, much less cured, without exchanging from a worse to a better, which is most agreeable in a dry, gravelly, stony, or sandy Soil; not low, because subject to Damps, not high and mountainous, because exposed to sharp Winds, that are more offensive to the Lungs than Damps, Vapours, or Fogs; neither can the Air of any place situate Westward of any great River, Bog, Marsh, Pond, or Moat, be healthful; by cause the Damps, Vapours, or Fogs, that are raised by a Setting Sun, continue all night, and are not dissipated before the Sun-rising the next day.

No Distemper is easier cured than a Consumptive Cough in the beginning. I mean of a Fort-nights, three Weeks, or (sometimes) a Months continuance, that is before the whole Mass is perfused with a putrid Slime, or the Bowels tainted with it. I dare be positive, I have cured hundreds in my time without the use of those common Pectorals, as Syrups, Lohochs, Lozenges, &c. which, as they annoy the Stomach in taking away the Appetite, so hinder Digestion, and contribute towards the putrefying of the Slime in the Stomach, and the Chyle that is daily ingendred.

18. I am fully convinced, that Consumptions in youthful Bodies strong before their Illness, not being very much depraved in their Bowels by a foul ill habit of Blood, and other Juices (Cacochymia) are cureable, if undertaken six Weeks, or two Months at least, before their expected end, and opposed by proper Remedies given frequently, and in large Doses; for I have oft observed, that many Medicines have failed in their expected Effects, by being under-dosed.

19. As for Issues made in the Neck, or Arms, they can bring no Relief, in respect of cleansing the Ulcer in the Lungs, or correcting of the putrid Slime, neither can External Fumigations signify much.

C H A P. XII.

Of continual putrid, and malignant Fevers.

1. **L**onger Experience hath induced me to recede from my former Opinions in continual putrid, and malignant, I may say, in all sorts of Fevers, where the Blood tending to a dissolution of the Mixture (I ought not to say subversion of the *Crafsis*, or Temperament, being less intelligible) of its Constituent parts (namely of its most subtle parts, which are the Animal Spirits, from the less subtle, and grosser, or of its sulphurous from the Mercurial, and saline parts) may properly be termed Putrefaction, which is not necessary nor constantly observed, to be attended with a Stink, as appears in a Gangrene of any part of the Body, that is seldom or never accompanied with a Stink; though a Corruption, *Sphacelus*, or Mortification always is. By this Separation the most subtle parts, or Animal Spirits running together, and being accumulated in greater heaps, do move much more impetuously, whereby the said mixture is more and more dissolved every minute. By this Acceleration of Motion the natural Heat (whereof Local Motion is the sole cause, as appears by Attrition, or rubbing any thing for a long time causes

a Heat ; or by the quick and violent motion of Spirits of Vitriol, being affused upon Steel, raising a great heat) is augmented into a greater and preternatural Heat, so that the preternatural Heat following the dissolution of the Mixture, cannot be thought to be the cause, (which must precede the Effect) but a consequent Symptom, and Effect of a putrid Fever, whose Essence therefore cannot be said to consist in a preternatural Heat, or can it so be defined. Moreover, there are some Fevers, wherein no preternatural Heat, quick Pulse, or high colour'd Urin is perceived, as appears in many malignant Fevers, where the mixture of the Blood is dissolved by a sudden extinguishing, or mortifying the Animal Spirits by venomous Particles commonly admitted from without, or sometimes bred within the Body, which confirms, that a Fever is not a preternatural Heat first kindled in the Heart, whereas it's oft kindled in other parts: As for Instance, when an Inflammation of any Bowel, as Lungs, Liver, &c. or where any great Pain is raised, there the Heat is first, and thence communicated to the Heart, and all the parts of the Body. That there is such a dissolution in the Blood, is evident by the Blood that is drawn off by bleeding in putrid Fevers, the parts being plainly separated one from the other. So that advising all the Coolers you can imagine, be it Snow-water, Whey, sour Butter-Milk, or Juleps made of Succory, Endive, Water Lilly or any other Waters, though enforced with Spirit of Vitriol, Sulphur, Nitre, or Salt, and Solution of *Sal prunelle*, they avail so little in Fevers, that they are generally found to increase them in all the Symptoms, so as the preternatural Heat, high and quick Pulse, deep-colour'd Urin, and the rest are sensibly raised to a much higher pitch. Neither doth Bleeding in the least contribute to the abatement of a Fever by cooling *per se*, but by some other

way *per accidens*, as I shall endeavour to explain hereafter. That Physicians have most of 'em if not all, wholly abandoned prescribing such sort of cooling Juleps, as being rather detrimental, and content themselves with advising small clear Posset, thin Gruel, &c. is an Argument, that putrid Fevers are not preternatural Heats, nor are they primarily caus'd by them.

2. That the Circulation of the Blood in putrid Fevers is too quick and the Blood too much rarefied by the too quick motion of the Animal Spirits is very apparent, and therefore lessening the Blood by bleeding, must also lessen the Circular Motion, and diminish the Animal Spirits; which being reduced to a moderate Measure, as may be done by one bleeding or two, is as much as can be expected from that remedy; the Spirits being thereby render'd more free, and the Vessels more Capacious, are put into a State of performing their Office with more ease in throwing off Heterogeneous, and very offensive Particles, that are got into the Blood, either from without, or bred in the Body. But should you proceed to a Third, Fourth, Fifth, Sixth, and Seventh Bleeding, you will draw off so many Animal Spirits, that the remainder must be insufficient to perform their aforesaid Office, wherein the cure of a Fever doth consist; and should you tap off all, or most part of the Blood in the Body, as I fear too many do, and have done out of Ignorance or Stubbornness, the Fever would, and must still continue proportionably in the same Vigour and Degree; so that this way of proceeding must sooner kill the Patient than the Fever. As for Malignant Fevers, the most Sanguinary Physician will scarce Adventure beyond a single bleeding, which the more judicious think to be one too many.

3. Glysters, gentle Purgatives, and Laxatives,
also

also mild Vomits, used sometimes in the beginning are not look'd upon as Remedies *per se*, and directly opposite to Fevers, but only helping *per accidens*, in removing excrementitious Humours, that otherwise might annoy the Spirits, and deteriorate the Fevers: Neither can Epispastick or Blistering Plaisters be thought to be otherwise advantageous, than by stimulating the Animal Spirits, (upon which, as I intimated formerly, they seem to Operate peculiarly) to throw off those heterogeneous and febril Particles; for I cannot conceive any are so wanting of Judgment, as to think, that the cause of the putrid, or malignant Fever is in the Serum only, whereof part is contain'd in those Bladders or Blisters, the *Cantharides* have occasioned.

4. It remains then, that the whole Stress in curing continual, putrid, and malignant Fevers, is by most of our Modern Physicians, laid upon such Compounds, as are call'd Cordial and Alexipharmacal Waters, Powders, and Electuaries, also some Chymical Preparations, as *Antimonium Diaphoreticum*, *Bezoarticum Minerale*, *Spiritus cornu cervi*, *Spiritus fuliginis*, &c.

5. The chief of those Cordial Alexipharmacal Waters now most in use are *Aqua Theriacalis*, *Aqua Protheriacalis*, (perhaps the better of the two, as consisting of fewer Ingredients) *Aqua Epidemica*, &c. The Electuaries are *Theriaca Andromachi* (which is accounted more temperate than *Mithridate*.) *Theriaca Londinensis*, and *Diascordium*. The compound Alexipharmacal Pouders are usually compiled out of some testaceous Pouders, as *pulvis e chelis cancrorum compositus*, and others of Crabs Eyes and Claws, Perl, Oriental Bezoar, burnt Harts horn, and sometimes mixt with *Radix Carlina*, *Contrajerova*, *Serpentaria Virginiana* (which are the chief) *Dictamnus Creticum*, *Angelica*, &c. By these, and the like, as the Goa Stone,

pulvis Pannonicus ruber, it's supposed the Heart is much strengthened, and the Animal Spirits encreased, and provoked to throw out the *materia febrilis* by Sweat, and the vitiated four ferment, as they call it, corrected and abated by being imbibed by the said testaceous Pouders, which vitious Acid being daily mixt with all their Edibles and Potables, and thence transmitted into the Vessels, and mixt with the Humours, would otherwise continue, and augment the Fever, being by some supposed to be the chief cause of many sorts of continual, putrid, and sometimes malignant Fevers; so that they do esteem Diaphoretics, and testaceous imbibers (which neither do they give in proportions by five parts in six, large enough, or frequent enough, to expect any great Advantage from) to be the only true and adequate Remedies, against all continual Fevers, as the Physicians of the Southern parts do only acknowledge Bleedings.

5. We are to observe, that the Animal Spirits are continually employed, from the beginning of a continual Fever, to a declination, in subduing the *Materia febrilis*, which is commonly termed a Digestion, or Concoction; at the Declination they apply themselves to the Separation, and Expulsion of the said febril Matter, which in colder Climates is more frequently by Sweat and Urin, and sometimes by Stool, Hemorrhage, Impostumations, or some few otherways.

6. If then the chief scope is to throw off and expel the febril Matter by Sweat, three things ought to be considered. 1. Whether Diaphoretics ought to be used before the declination of a Fever, at which time only they appear to be healthful in assisting Nature to throw off; for it must be own'd by all experienced Practicers, that the *causa febrilis*, be it vitious Humours, heterogeneous Particles, or what other offensive Matter they are

are pleased to allow, must be first subdued, or digested, and separated, before it can be expelled by Sweat; and therefore should you exhibite the largest Doses of Diaphoretics, that Nature can possibly bear, and second them by loading the Patient with a number of Bed-cloaths, he will scarcely be brought to sweating; and if peradventure he should happen to be forced into a Sweat at the augment, or state of the Fever, it must be to a very great Detriment, by diverting the Spirits from their necessary task, and squeezing the *serum* from the Humors, whereby they are thickned and hardned, which ought rather to be diluted at those Seasons. Moreover, by putting so great a force upon the Spirits, they must necessarily be much divided, dissipated, and inflamed. Secondly, whether Sudorificks given in Moderate Doses, so as to be insufficient to provoke Sweat, do assist the Spirits by increasing them, (I mean such as contain some vinous Spirits, as Epidemic, as Treacle-water) putting them into a gentle Agitation, whereby the febril Matter may be subdued, or digested. *Vox Medicorum* doth proclaim they do, and therefore they are prescribed by them from the beginning to the ending of Fevers, in no greater measures, than what Nature seems to require. For my own particular, I can scarce believe, that those Spirits are, or can be render'd Homogeneous to the Animal Spirits (whatever they are when a Man is in Health) being now under a great Disorder, and Disturbance; and as for the other subtle Particles, that are supposed to be in the ingredients of the said Alexipharmacal waters; how far they are conducing in subduing the febril Matter, can best be prov'd by the Success, ten dying under the use of them, to one that Recovers, whose Recovery may rather be attributed to the strength of Nature, a due Regi-

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men in his Diet, and doing him no hurt by improper Remedies. Thirdly, Supposing fictitiously, that Diaphoretics were proper, the uncertainty of their Operation would often occasion a failure of the Effect, that is expected from them. *Purgatives* and *Vomitories* seldom or never fail in their Operations, if justly Dosed: But *Sudorificks* and *Diuterics* very oft, though administered in great quantities. Many Quarterns of Plague-water have been drunk for Pleasure at one time, by several that are in Health, without the least Sweat following upon it: And as many Diuretic Juleps have been swallowed by Nephritics, who have not made a drop of Urine the more after them.

True it is, that many upon receiving of crude saline Particles from without, I mean the External Air into their Bodies, (which is commonly termed, taking of Cold, for want of sufficient Cloathing, to keep the said Particles out, and by the Antients termed (ignorantly enough) Constipation or stoppage of the pores, an expression wholly unintelligible; for were the pores stop't to exclude the admission and emission of the Air, together with the fuliginous steams and vapors, no Man could live two minutes, the Animal Spirits thereby being stifled, and all the Humors and Juices in the Body brought to total stagnation, and consequently the Actions of all the Bowels ceasing) have fallen into a Fever; namely, *Diary* or *Ephemera*, and sometimes a *Febris continua Impurris*, or a continent Fever; upon taking immediately in a *Diary*, some potent Diaphoretic, with the Assistance of a Load of Bed cloaths they have soon fallen into a Sweat, which concluded hath wholly carried off the Fever, by expelling the said saline Particles, that did violently agitate the Animal Spirits. Now from hence it is, that many do believe, as Sweating hath carried off

off the Diary, it must also either very suddenly remove a continual Putrid, as also a malignant Fever, or at least very considerably abate it. But the case is otherwise, the Causes of a continual putrid Fever, and a malignant Fever, are much different, and are rendred much more by forcing Sweats in the begining, as is observed before, unless attempted within the first twelve Hours, after a Person hath been newly attackt.

7. Wherefore I do much suspect, that there is scarce any Remedy used, that may be truly termed an Antifebril; though there are a great many that are in common use, and yet not commonly known. or acknowledged to be such, which, if well Dosed, and oft exhibited in proper Seasons, may evidently and sensibly be discovered by an heedful Physician, to subdue the febril Matter, though but slowly, and therefore ought to be began to be given very early, and continued. Besides these, there are other Medicines, which in Four and Twenty Hours do abate all the common Symptoms in a continual and malignant Fever, though even these, if applied too late, the Spirits being then almost wholly subdued, and the febril Matter increased, and render'd indigestible, and the Bowels begun to be toucht in their substance with putrefaction (and a putrefaction of that kind is absolutely mortal, unless you can create new Bowels) may fail in their Performances.

There is a Medicine I have oft prepared, but with much Labour from a Mineral and Vegetable, which upon view of the Eye may be perceived to lessen those dangerous Symptoms of a malignant Fever, or any putrid continual Fever, and speedily subduing the material Causes of the said Fevers, & exactly answering to the Indication that is drawn from them; I do not remember to have met with it in any Author, neither

do I hear it was ever prepared by any besides my self. As for the *Peruvian Bark*, I have several times attentively observed, that the continual Fever being under very promising Circumstances, hath upon the use of it changed sensibly into worse Symptoms in six or twelve Hours, so that no means afterwards could be applied capable to retrieve that Error.

8. Narcotics are seldom forgotten in this Distemper, especially where so seeming a relief is perceiv'd on a sudden, in the sudden suspension of its Symptoms, by detaining or holding fast of the Animal Spirits from Operating upon the Febril matter, that causeth these Symptoms, which soon return with a greater fury, upon the letting loose of the said Spirits, by the dissipation of the Force of the Hypnotic Medicine. This seeming Alleviation doth oft encourage the Physician to a continued use of Dormitives, throughout the whole course of the Fever, the benefit whereof is experienced, not only to consist in a longer delay of Death, but also in a more certain consequence of it. Notwithstanding, this great abuse doth not remove the necessary, seasonable, and seldom use of Narcotics, when and where urgent Symptoms may require them. This is most certain, that all *Narcotics* are diametrically contrary to the Animal Spirits, and the Nerves, and consequently all Nervous parts, and most pernicious in any Disease of the Brain, which if there was none before, the long use of 'em will infallibly cause one. On the other hand *Opiates* do effectually suppress all manner of Evacuations, except Sweating, which they promote, and therefore very oft they do put a stop to all sorts of Hemorrhages by Stool, Vomiting, Urin, and at the Nose; likewise to frequent Vomitings, and Diarrhæas, or Loosenesses, to a Miracle. So that it's no wonder to me, that Quacks do great things

things with *Opium*, I mean sometimes great good, and very oft great Mischiefs. That seldom great good gives 'em, and keeps up their Reputation, so as to draw abundance of Patients to them, and the frequent great Mischiefs they do are as soon forgotten, as the Funerals they occasion. *Opium* is a Quack's Right-Hand, and where ever you find a Quack without *Opium*, you may hang him. *Opium* he puts to his Balsamic Drops, to his *Sal Volatile*, to his Tinctures and to every thing.

C H A P. XIII.

Of the Stone.

i. **T**HAT the Urine is saturated with *Sal Armoniac*, its Distillation doth plainly confirm to us, and that the *effatous Serum* of the Blood, whereof the Urine doth consist, must first contain the same, or else the latter could not receive it; for *nihil dare potest quod non habet*, and consequently that the whole Mass is thorowly replenish'd with *Serum* doth also appear from the Distillation of Human Blood, which yeilds a plain Spirit of *Sal Armoniac*, little or nothing at all different from the other. That *Sal Armoniac* is the most tough Salt of all others, cannot be disputed by those, that have pounded common Salt, *Sal gemmae*, *nitri*, or any other Salt, in a Mortar, these being the most friable and brittle, and consequently the less unfit singly to be coagulated into a Stone; whereas *Sal Armoniac* being so tough and tenacious, especially being mixt with crude sli-
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my mucous Dregs, that remain after the imperfection of the Digestion in the Stomach, together with some Sabulous Matter of the Blood, I do conceive may easily be coagulated together by a vitious limpid gleet dripping out of the Nerves (as I have already mentioned in one of the preceding Chapters) that are disseminated through, and are terminated in the *Parenchyma*, and Membranes of the Kidneys. So that the pretending that Slime adhering to the Kidneys, or its inward Membrane, is baked into a Stone by a preternatural heat of the Kidneys, like unto Clay baked in a Kill into a Brick by the extream heat of a Fire, seems a Jest to me, since it cannot be imagined, that any heat of that degree is ever felt by any Nephritick Patient; or, if possible, could it be endured by him. Moreover their pale Complexions, pale Urin, Sluggishness, infrequent Urination or making of Water, are all Indications of Coldness; add hereunto, that Chrystal is generally found; and probably bred in the Snow; Rocks, Flints, and other Stones in the Bowels of the Earth, where no degree of Heat was ever perceiv'd. Wherefore whatever extraordinary or preternatural Heat may be felt by Nephriticks about their Loins or Kidneys, is commonly caus'd by Gravel, Stone, or some other obstructing, or corroding Matter, occasioning Pain, and consequently Heat.

2. In what part soever this Urinous Salt, or *Sal Armoniac* is found, (through want of being separated and expell'd by the Kineys) be it in the Guts, Urinary Bladder, Gall-Bladder, Liver, Spleen, Brain, Stomach, Lungs, in the fleshy part of the Tongue, and of the Kidneys themselves, also about the Joints, though as remote as the extremities of the Fingers, there Stones may be, and have been engender'd, as is attested by

by a multitude of Authors. Some of these parts being allowed by most Physicians to be of a cold Temperament; as the Brain, Guts, Bladder, &c is a Second Argument, that plainly evinces, the Stone is not engender'd efficiently by Heat, though it may sometimes very considerably conduce to it. But to say, there is a *Lithopoetic* Faculty, or an innate calculous and Sabulous Constitution in the Kidneys, as is asserted by so great an Author, as *Fernelius*, seems to be very idle; as if he would infer, that none were Subject to the Gravel and Stone, but such as deriv'd Hereditarily a sabulous and calculous Disposition of the Kidneys from their Parents: What Satisfaction there is in the Word *Lithopoetic*, I cannot well apprehend.

3. Before I recede from this Subject, I ought to answer one Objection, viz. That there is not always mucous Matter concurring to the Generation of the Stone, as appears in the Stone, that is sometimes found in the Gall Bladder of a Man, and very oft in that of an Ox, which consisting of Gall or Choler, cannot be Suppos'd to have any Slime, Phleam, or Mucus adjoin'd to it, being for the most part found simple unmixt, and contrary to the Nature of *Mucus*, or Phleam, which is always Glutinous or Viscous; I allow the whole, and make answer, that the Stone in the Gall-Bladder is oft formed by concretion, through the separating or drying away of its thinner and moister parts; in like manner Morter dryeth in some time into a Stony Substance; as also doth *Tartarum Vitriolatum*, that's made by Concretion, besides many others; on the other hand I must tell you, I am not the first that hath observed the Gall in the Gall-Bladder very Viscous and Roapy, through the admixture of some slime or *Mucus*, that's separated with it from the Blood, and then it will be allow'd to be

be Matter very proper for the Formation of a Stone. In the same manner a Stone in the Kidneys may be formed by Concretion, without the admixture of Mucous Matter, but then the Stone becomes friable, and not very hard, and of a more red dy colour, whereas according to the proportion of Mucous Matter, concurring to the formation of the Stone, it becomes hard and pale.

The Stone of the Kidneys is commonly observed to precede that in the Bladder; and any Stone, though of a very small Dimension, falling from thence, through either of the Ureters into the Bladder, is conceiv'd to be the Foundation of one there, which by lying a considerable time, doth receive a daily growth from the Urinous Salt, and Slime, that descend thither. This in my Opinion is not always necessary, it being possible enough for a Stone to grow in the Bladder, without having the Rudiments laid in the Kidneys; moreover, it hath been observed, that at the same time one of the Kidneys, and the Bladder, have each contain'd a Stone.

4. To the formation of the Stone, must be concurring. 1. Depauperated or vitious Animal Spirits, that are too weak to perform the Separation and expulsion of the abounding *effæctous Serum* of the Blood in the Kidneys. 2. A Serum too much Saturated with a *Sal Armoniac*, that's mixt with too much common Salt, which all Edibles do contain in some proportion, and so do Wine, Beer, Whey, and other Drinks; for you are to understand, that *Sal Armoniac* is a mixt Salt, consisting of common Salt, and a Fuliginous Salt, united together, as appears by the Artificial making of

* By *Effæctous* I understand a Serum, that hath contributed all its nutritive Particles to the parts of the Body, and is now become a meer excrementitious Liquor.

Sal Armoniac, which is by mixing a pound of common Salt, to half a pound of Soot, and boiling them in three or four pints of fresh Urin, to the thickness of Honey, which is then to be sublimed in subliming pots into *Sal Armoniac*. The natural Salt *Armoniac* is Urin of Chameles, Horses, or Oxen, concreased or Evaporated by the hot Sands of *Arabia* into a Salt. 3. A Slime or *Mucous* to Cement the Salt with the 4th, which is Sabulous Dregs of the Blood. 5. Narrow Passages of the Kidneys. So that Salt, Salt-Meats, Pickles, and Spices are chief Materials for the Stone. 6. A Vitious gleet dripping from the Nephritic Nerves, Coagulating the Materials together. This is the short Theory I do propose to my self, of the Generation of the Stone in the Kidneys, which is suggested to me by Practical Experience, though I could wish, that among so great a Number of very Ingenious Physitians we have here in *England*, (who are as capable as any in the whole Universe, though not so industrious) some would take the pains, to detect a more probable Theory of the Stone, and other Distempers, which would certainly prove a great Advancement to the Art of Physick, and no less Benefit to miserable Patients. However, as defective and Hypothetical only this Theory may be, it conducts me much more successfully in the Practick against the Stone, and other Diseases of the Kidneys, than the common Doctrine. I do own, that this and all other preceding Theoretick Notions might be render'd much plainer by branching their Illustrations into so many particular Volumes, but my invincible Aversion to all manner of Prolixity, together with my weak Capacity of rendering them any more than scarcely probable, or other than meerly supposititious, doth entirely discourage me from any such Attempt.

The Practical Part of the Stone consists in
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these Particulars; 1. In the Means to prevent the Growing of it. 2. In the Cure of the Stone. 3. In the Removing a Fit, or Paroxysm of the Pains, occasion'd by the Stone. 4. In the preventing the return of a Paroxysm of the Stone, which may be term'd a Palliative Cure.

1. Those that live Sedentary Lives, and use little or no Exercise, as most Students, and Debauchees in sharp Wines, and very new, or stale Strong Beer, are very Subject, and properly dispos'd to breed the Stone; but beyond all, those that eat much Salt with their Meat, or feed much upon Flesh or Fish Salted, Smoak'd, or Pickel'd. Wherefore interposing moderate Exercise between their Studies, and abstaining from their grave Thoughts by intermixing Cheerfulness and Mirth, to alleviate the Animal Spirits, which are the chief Agents of Health, and being indispos'd, or vitiated, of Diseases. This is one Way to prevent the Stone in the former, And exchanging sharp Wines into milder, and diluted with a light thin Spring Water, and using them with a *quantum sibi*, and a total Abstinence from Stale Beer, substituted by small Ale, will produce the like Effect in the latter. To drink Wine at Meals, as it lays a Foundation for the Stone, so using Small Drink in its stead prevents it: And in my Opinion, pure Wine ought not to be drunk, according to the Rules of Health, before the Chylification is finish'd, and the Distribution at hand, unto which it may be very assistent. A Fish-Diet moistened with too much sharp Wine, and a Bread and Cheese-Diet seldom fail of administering sufficient Matter for the Stone: In short, keeping the Stomach clean, in the manner as hath been before describ'd, is the chiefest Way and Means to prevent breeding the Stone.

2. The Cure of this Disease is commonly attempted by Bleeding in the Arm (tho' some judge

judge it more advantageous in the Foot) in Bodies, that are moderately replete, to make room in the Vessels, which the subsequent Laxatives and Purgatives will necessarily require, as working by Fermentation, that will occasion a Rarefaction of the Humours, and consequently a Distension of the Vessels, which otherwise might cause some Local Disturbance of the Stone, or occasion a Paroxysm of Nephritick Pains. Among the Laxatives, *Cassia Fistularis* newly drawn over the Steam of a Decoction made of Emollient or Diuretick Vegetables, is made choice of as a sacred Remedy, either by its self, or mix'd with Rhubarb and Cream of Tartar, or *Diasenna* (which is oft suspected, because the *Scammony*, that is an Ingredient in it, is accounted too rough, as causing too high a Fermentation, or Ebullition) or *Pulvis Senae comp. maj.* or *Pulvis Sen. comp. min.* This is judg'd necessary to be repeated once or twice, at convenient Intervals; which as I have try'd more than once, I have always found, not to reach the Morbifick Matter, and therefore am oblig'd to make use of such Additions, that should penetrate without any Hazard of putting the Spirits upon a Ruffle. This being premised, the Saxifragers, or Stone-breakers are to be introduc'd, with this Election and Preference, That those, which have an extraordinary Character stamp'd upon them by great Authors, or Physicians, ought only to be recited; for should they all be enumerated here, to which the Faculty of Stone-breaking is attributed, a Quire of Paper would be insufficient to contain them, there being no Disease in the whole Body of Man, against which so many Simple and Compound Remedies (in all manner of Galenical and Chymical Forms) of Vegetables, Minerals, and Animals are recommended, as against the Stone; for I do believe I never met with a Physician, Apothecary, Surgeon, Empirick, Midwife, or any Old Woman,

that had not an infallible Remedy against the Stone and Gravel.

But before I make mention of any of these Stone-Grinders, it will not be amiss to inquire by what Quality, Vertue, or means it is expected by Physicians. they should perform this great Work of Breaking the Stone in the Kidneys and Bladder. Some endeavour to effect it by Medicines that have a Corroding Quality, by which insinuating into the Pores of the Stone, tear all asunder, and dissolve it, in like manner as *Aqua fortis* dissolves Silver, Copper, and Tin; *Aqua regia* Gold; and Juice of Limons, and distill'd Vinegar Crabs-Eyes, Pearl, Coral, &c. To this purpose, for Corroding and Dissolving the Stone, are recommended *Spirit of Vitriol*, *Sulphur*, *Salt*, *Nitre*, and *Juice of Limons*. I have experienc'd most of these in the Cure of the Stone, and ever observ'd, that within less than an Hour, they would certainly put the Patient into an horrid Fit of the Stone Cholick, besides the Pain in the Back; against which an Emollient Laxative Clyster, with the Exhibition of a gentle Narcotick at the end of its Operation, gave present Relief; and glad I was to come off so. That a few Drops of any of those recited Spirits, well diluted with Parsley or Fenil-water, and sweeten'd with Syrup of the 5 Opening Roots, being thus obtused, and afterwards broke in their Vertues, by passing the Stomach and other parts, and carrying thence some slimy Particles to blunt them more, should at last, upon their Arrival to the Kidneys, be endu'd with a force sufficient to crack a hard Stone, is very wonderful. But to clear the Point, pour Spirits of Vitriol upon Steel, as is directed in the Preparation of *Vitriolum Martis*, these readily entering the Pores of the Steel, whose Figures are adapted to receive them, move very quick and impetuously, piercing through
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the whole Body of the Steel in very few Minutes, whereby not only a very great Heat and high Ebullition are occasioned, but the Sulphurous Particles, that ty'd the Salin together into a Body, are totally expell'd; as you may perceive by the great Stink attending of them in their Evaporation; and the remainder is turn'd into its First Principle of Vitriol. In like manner the Spirits of Vinegar, or of Juice of Limons, piercing into the adapted Pores of Bezoar-stone, Pearl, Coral, Crabs-Eyes, Egg-shells, Oyster and Mussel-shells, Crabs-Claws, and the like, by the quick and violent Motion of their most subtil pointed Particles, cause an Heat and Ebullition, and chase out the Sulphurous connecting Particles; whereby nothing is left in the Vinegar but a Tartar, (*Limus*, or *Fex*,) and if wash'd, may be call'd a *Calx* extinct, though honour'd by Chymists with the Name of *Magistery*; that is, after the Precipitation with Oil of Tartar, and the sweetning of it with several Lotions of warm Water; which, in reality, is no more than a *Terra damnata*; and among those recited, I take the Bezoar-stone to contain the finest Earth; and next to that the Pearl. As for the rest, I look upon them all as equal.

2. Now if you can suppose the Pores of a Nephritic Stone in the Body, to be adapted with Figures answerable to receive the pointed Particles of the Spirits of Vitriol, Salt, Nitre, Tartar, Vinegar, or Limons, you may reasonably believe, there is a Vertue and possibility in these Acids of dissolving the Stone in the Kidneys or Bladder, notwithstanding that they are not taken in so great a quantity, as almost to corrode, and that they do not arrive in their full force to those remote Places; yet their frequent Repetitions, and long continuance of them, under a milder Vertue, will answer their disproportiona-

ble dosing, and accomplish the same effect: So that if this supposition were true, as it is most certainly false and erroneous, you are not to apprehend, that those Acid Stone-breakers were to perform that Work, in the time almost that you may crack an Apricot Stone, as most of the Medicine-mongers and Empricks pretend to do, in twice or three times taking. But to subvert your Supposition, and consequently to divert you from losing your labour in the use of Acids, I need only to alledge to you, that they are in no wise shaped in the figures and dimensions of their Particles, proportioned or adapted to enter the Pores of a Stone bred in the Kidneys or Bladder, as you may easily make trial, by pouring Spirits of Vinegar, (I mean, Vinegar twice or thrice distilled) Juice of Limons, or simple water acuated with such a proportion of Spirit of Vinegar, or Juice of Limons (for above that degree, no Acid can be taken into the Body without corroding the Stomach) upon an indifferent hard Stone, taken out of the Bladder or Kidneys, which being inclosed in a Matrass with its blind Head, and placed in a warm Sand Bath Twenty Weeks together, at the expiration of which you may take out the Stone, so far from being pierced by the Acids, that it's grown much harder than it was before. But what is more, should you pour the strongest *Aqua fortis*, or *Regia*, or Spirit of Vitriol not diluted, upon it, and let it stand as long as you please, the Stone will come out harder than it was put in. As Gold and Silver cannot well be reduced, or dissolved into a *Calx* by ignition, but by amalgamation, and immerfive (as the Chymists term it) Calcination by corrosive Acids; so on the contrary, the Stone that's bred in the Bladder and Kidneys, cannot readily be dissolv'd into a *Calx*, by an immerfive Calcination, but by Ignition.*

* Because the Sulphur, that tyeth the constituent parts of the Stone together, can only be consum'd or destroy'd by fire, whereas no acid will, or can attempt upon Sulphur.

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That all Acids (*Quatenus Acids, and per se*) are Enemies to the Nerves, nervous Parts, (as Membranes, Tendons, &c.) and to the Animal Spirits, common experience doth attest; whence it is, that most Men, upon only taking of a very sour thing, being Potable or edible, are apt to make four Faces, and to shiver, or to undergo small Tremblings all over, (which are small convulsions of the Nerves, Tendons, and circumvestient Membranes of the Body) by pricking of the Membranes; and though their pricking in tasting of any very sour thing, is only perceiv'd by the Nerves and Membranes of the Mouth, it is nevertheless felt all over by the continuity and contiguity of all the Nerves, nervous Parts, and Membranes of the Body, like unto two, or more unison Fiddle-strings, whereof one being touch'd, causeth the same sound in all the others; or like unto a Cord that's extended, which when smartly struck at one end, makes the whole Cord shake as far as the other end; whence I do infer, that what ever expulsion, whether by Vomiting, Stool, or Urine, (and sometimes *per accidens* sweat) is occasion'd by the force of Acids, is by pricking, stimulating, or irritating the Nerves, or nervous parts, by their rigid Pointed Particles, and a faculty, (which all Acids possess, contrary to all fuliginous and armoniac Salts) of precipitating of them, and consequently throwing of them down the Ureters; and therefore I doubt not, but that in some kinds of suppression of Urine occasion'd by the Stone, Gravel, Mucus, Crumbs of Blood, and at some seasons, Acid Medicines may be of great use, among which I do in my Opinion prefer this following.

℞ *Aceti Vini albi Gallici destillati, (vel si magis, succi Limonum, vel citri, cujus posterioris usus præstat) ʒj. Ol. amygdal. dulc. rec. extract. ʒjss. probe & diutine cum Sacchar. candi vel Sacchari Althææ. ʒj. triti. vin. alb. gall. ʒ iiii. M. This*

This proves very diuretick in many, and that by stimulation, as I have said before. But it's observed of Juice of Limons, that if frequently used, it's apt to cause a Thrush in the Stomach, by its too sharp, or rather somewhat corroding quality, occasioning sometimes Vomiting or a violent Looseness, for which reason the Juice of Citrons is preferred, consisting of an Acid not so acute, and yet not less diuretic. However, White-wine Vinegar distilled is experienced to excel either of them in a diuretic Faculty, and many others, as being much more penetrating, and consisting of Particles more Subtil and Volatil. Though Vinegar is vulgarly reputed a potent restraining, yet it cannot deserve that denomination so much as Spirit of Salt, Nitre, Juice of Limons, or the Acid of Tamarinds; and to speak truth, it cannot properly be term'd Adstringent, which is a quality that's binding, purging (drawing together like a Purse) and Contracting, proceeding from austere Particles, such as are perceived in Allom, Juice of Slows, and the like; but nothing resembling that can be discovered in Vinegar, no more than in Juice of Limons, or Spirit of Salt. True it is, that all Acids cause an Asperity or Roughness by their acute Particles, pricking the Nerves and Membranes, that are nervous expansions, which by a sort of resistance rise up into those minute Points, * thereby endeavour- * Like unto a Goose-
 ing rather to expel and throw skin.
 out; whereas the others by their Austerity, though occasioning a Roughness, yet doth detain, and bind in whatever they contain: What is in Vinegar, but an Acid Spirit, united to an Acid Tartar, melted as it were *per deliquium* into a Moisture or Liquor? Vinegar is so far from binding, that it renders

renders any thing to which its united, more piercing expulsive, and solutive also, as appears in *Sal Tartari Sennerti*. *Colocynthis* steep'd in Vinegar is render'd much more purgative, than when macerated in Brandy or Wine. Three Grains of *Laudanum Opiatum* taken to cause Sleep, and drinking upon it a Draught of any Julep, that contains an Ounce of distill'd Vinegar, or only as much *Oxymel Simplex*, shall occasion a deeper Sleep, than if ten or twelve Grains of *Laudanum* had been swallow'd, whereout probably some would never awake again. Others upon drinking of four Beer (being of the same nature as Vinegar) are immediately put into Gripes and Looseness. However I will not be positive in this, or scarce any thing else; but to me, the Adstringent quality in Vinegar seems a vulgar Error of some Ages.

That Acids (excepting those that are merely Auster) are the chief and most proper Medicines (I will not say certain, for they don't prove always so) for Expulsion, and promoting or irritating the *Expultrix* Faculty efficiently in the Animal Spirits, and Instrumentally in the Nerves and Membranes, may be Instanc'd in Vinegar, which in a greater quantity provokes Vomiting, in a lesser Stools and Urin, and Sweat in those that are disposed. It is certain, that *Prophy-lactic* Waters made by Infusion, and not distillation, being commonly well impregnated with Vinegar, and *Acetum Theriacale* are incomparatively more ready and potent in half the proportion, in promoting Sweat, (which also is by expulsion) than Treacle-water (wherein is contain'd only the Phlegm of some Acids, the heavier and stronger part not coming over the Helm in distillation) *Aqua Epidemica*, or *Propheticalis*. One Dram of *Virginian Serpentry*, being macerated in Vinegar, shall raise a quicker and more copious

copious Sweat, than three Drams infus'd in Wine or Brandy. Cream of Tartar and Tamarinds, by their pungent Acidity, move the Expultrix Faculty of the Guts to Stools. Juice of Limons, Citrons, Oranges, Spirit of Tartar, Nitre and Salt, prompt the Kidneys to expel Urin, &c.

4. *Spiritus Tartari*, *Nitrum tartarificatum*, and *Tartarum Vitriolatum*, are by most that have made tryal of them, accounted the most powerful of Diuretics. But there being so offensive an empyreumatic stink in the Spirit of Tartar, proceeding from a remaining Admixture of some lixivial Earthly Particles, imperceptible to the Eye, whereto the *Empyreum* is almost inseparably adherent, causeth its use to be much neglected, which however may be removed, by mixing the Spirit with fine wheaten Flower into a Paste, and that equally mix'd with the *Caput mortuum* of Vitriol, and so drawn off twice or thrice in a Glass Retort; or mixing the Spirit of Tartar with *Coibotar*, i. e. *Calchantum rubefactum*, and drawing it over once or twice in the same manner; wherein you need not to fear, that any Vitriolic Spirit will mix with it, in regard that the degree of heat, that will be sufficient to raise the Spirit of Tartar, is not by much intense enough to force out the Spirit of Vitriol. After all, a pure *Acetum distillatum* is not much inferior to it.

5. By what means those Magisteries of Crabs-Eyes, of Mussel Shells, Egg or Oyster-Shells, operate such pretended effects of forcing down Urin, and breaking the Stone, is my next business to inquire. It is commonly concluded, that whatever drives down Urin forcibly, doth break the Stone by oft dripping upon it, like the dropping of a Guttur falling oft upon a Stone under it, doth by length of time make a hole into it. *Gutta cavat Lapidem non vi, sed saepe cadendo.*

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ando. It is thence inferr'd, that those recited Magisteries are potent Diuretics, (which my little experience doth wholly contradict,) but whether they do their work by cutting, hammering, or dissolving the Stone *tota substantia*, ought to be consider'd. It cannot be pretended, that in those Magisteries, and particularly in that of Crabs-Eyes, there is any thing besides a fine Earth, the Acid Particles of the Vinegar, having entirely driven out the sulphurous Particles of the Crabs-Eyes, and seated themselves in their Rooms and Pores, which they had left; so that you are not to apprehend, that the Vinegar is thereby sweetned, bycause the Alcalious Particles (which in them ought not to be so call'd, for they are not such) are mortified or broken, and thereby the Liquor, wherein the Acid Particles were, remains insipid; no, this is quite otherwise; for the same Acid or Vinegar Particles are still in being, having only changed their place; for put the whole solution together, *viz.* the insipid Liquor, and impregnated fine Earth of Crabs Eyes into a Glass Retort, and being placed in a Sand Furnace, you will by distillation with a smart heat, have your Vinegar return'd to you again, not at all, or imperceptibly little impair'd in its sharpness, or lessen'd in quantity; so that this pretended *Magistry, Solution, immersive Calcination*, or what else you please to call it, is nothing else, but a concentration of the Spirit of Vinegar, in the entirely destroy'd Crabs-Eyes which being wash'd off from the saline Acid Particles of the Vinegar, or first being precipitated by the instillation of Oil of Tartar, and afterwards wash'd with repeated lotions of warm water, is left not worth a straw, and fit for nothing but to make a very indifferent *Fucus*, or Cosmetic, which that of Egg shells doth by much excel.

excel. Wherefore Crabs-Eyes by Triture upon a Porphir reduced to an Impalpable Powder, and exhibited in a convenient Vehicle, do in a Moment remove that troublesome Symptom, improperly call'd the Heart-burning, by admitting the acute Particles of the almost corroding Acid Liquor (floating in the Stomach, and vellicating its Nervous Tunicks) into their minute Recesses, whence the Sulphurous Particles were so suddenly chac'd; and if upon this the Patient takes twelve or fifteen Grains of pure Chrystallized Salt-Petre, (not *Sal Prunella*,) in a draught of Barley or Milk-water, at a few Minutes distance, he shall perceive the Crabs-Eyes, with the contain'd corroding Particles, sensibly precipitated into the Guts.

6. Crystallized Nitre is certainly the most wonderful Salt of any, and the most active and potent Diuretick, or Piss-driver, of all the whole Catalogue. It is a Salt entirely consisting of Acid Spirits or Particles, concentr'd or clos'd up in a little tough saline Matter: Its Activity and quick impetuous Motions is beyond all others, except Mercury; for no sooner can you touch your Tongue with it, but immediately its subtil Particles enter the pores of the Moisture residing in the spongy Recesses of your Tongue, and of the Spittle about it, which they divide, attenuate, expand, and dilate, or rarefie so very quick, that your Mouth seems to run over with Moisture in an Instant. This Nitre, or Chrystal Mineral, being taken in a proportionable Dose, in a sufficient quantity of a suitable Vehicle, doth soon after rarifie, attenuate, and tumefie all the Humours, Liquors, Serosities, and Moistures it meets with in the Stomach, and other Bowels and Passages, whereby the thinner Parts are separated, thrust forward, squeez'd, and expell'd towards the Kidneys, and thence to the
Ureters

Ureters and Bladder, so that I have not yet found any thing comparable to it for a Piss driver. That I do prefer it thus unprepared before *Sal Prunelle*, is, bycause by the melting and inflaming *Sulphur* upon it, a great part of the most active and penetrating Spirits, and most subtil Particles are driven out, and consequently much enfeebld. But perhaps you may reply, That their crude Particles are by the inflaming of the *Sulphur* expell'd, and the *Nitre* thereby digested; which is all fantastick. Besides this extraordinary Virtue, these Crystall Minerals have a Power so surprizing in the Thrush of the Mouth, Internal and External Inflammations, and many other Diseases, that 'tis a great Wonder to me, it is no more taken notice of in Physick. But of the nature and properties of this nitrous Salt, you may be better informed in one of the preceding Theorems of the Corpuscular Philosophy, and in the description I have made in one of the Chapters before of the Constitution of the animal Spirits.

7. To return to the Remainder of Inquiry into the Manner and Ways, whereby these Virginal Earths of the aforesaid Testaceous Magisteries do drive down Piss. Upon the strictest Search my slender Capacity can make, I do not find any thing to attribute that Faculty unto, except to little cutting pointed Sands of those Earths, that by pricking the Membranes of the Stomach, Guts, and other Parts, they stimulate them; and by Contiguity, and Continuity of Parts, stimulate all the Membranes of the Body to expel loose separated, and floating Serosities to the Kidneys and Ureters. That by pricking one Membrane, you do, as it were, prick all the rest, appears in the Instances above-written, of a Touch upon a Cord extended, or a Sound made upon one Unison; and by the pricking
of

of the Membrane of the Tongue by any very four Taste, all the Membranes of the Body seem to be affected with the same little Punctures, as appears by sudden small Shiverings all the Body over; as likewise, in another Instance of the Bladder, which oft, upon having made Water newly, the Air from without presses into it, to fill up the *Vacuum* in some measure, whose Nitrous Particles wherewith it is repleted, do prick the Membranes of the Bladder; upon which a sudden Shivering (which is an Attempt or Endeavouring of Expelling) happens all over the Body, by the propagated Sense of Pricking to all the Membranes.

8. 'Tis in this respect, that Glass being powder'd, is also recommended for a potent Diuretick, by reason of those acute cutting or pointed Particles, that are suppos'd to be in it, which pricking and stimulating (being likewise accompany'd with Weight, that contributes very much, and therefore ought to be administer'd in greater Quantities, than are usually given) the Tunics of the Stomach impel Serosities to the Kidneys in manner before express'd. Upon the same Consideration it is, that *Lapis Judaicus*, *Lapis Nephriticus*, *Lapis Spongia*, Medler-stones and probably Peach and Apricot-stones, Mountain-Crystal, *Lapis Lyncis*, little Stones that are found in the Stomach and Gall-Bladder of an Ox in the Month of *March*, in the Liver of a Wild-Boar, in the Head of a Perch, and in the Throat of a Carp, and the Stones that are taken out of the Kidneys and Bladder of a Man, and indeed all other hard Stones, being reduc'd to a Powder, do still retain some acute cutting Particles; for if any hard Substance be finely pulveriz'd, and afterwards grinded into an Alcohol, or impalpable Powder upon a Porphir, so as all the Points of the Minute Particles are obtused,

tused and entirely broke, it loseth all its Diuretick Virtue. Wherefore it is, that the Magistery of Crabs Eyes, and other Testaceous Bodies are so far from being Diuretick, that they prove Emplastick, and consequently putting a stop to all sorts of Expulsions. For the reasons alledg'd I am of Opinion, that Crabs Eyes, Coral, Bezoar, and the rest of the Testaceous Bodies are destroy'd by all manner of Preparations, (whether in order to Magisteries, Tinctures, Salts, or Deliquious Oils,) except moderate Pulverisation, which renders them more susceptible of Acid Salts, whereof the Moisture or Liquor being disrob'd, now serves for increase of serous or rather Lymphatic Matter, that is to be expell'd to the Kidneys for the matter of Urine, or the Ambient Pores of the Body for the Matter of Sweat, whereunto the Membranes are stimulated by the Acid Spirits, wherewith the Testaceous Powders are impregnated.

9. Among the pretired Stones, Dogmatists pay the most Respect to the *Nephritick Stone*, and *Crystal*, which latter, when brought into a Powder, by how much it remains more hard, subtil, and consisting of acuated and pointed Particles, so much the more it is adjudg'd to exceed Glass in a Diuretick and Saxifragous Quality, both operating in the same manner, and by the same means. As for the *Nephritick Stone*, there are such wonderful Stories recorded of it, that I am almost ashamed to offer the Recital of them; and at the same time, am surpriz'd at the unlimited superstitious Belief of Mankind. Before I proceed, I ought to give you some Description of it, that you may not be impos'd upon by a false one. The best of these Stones are brought from *Turkey*, and the *Spanish West Indies*, which they call *Igiada*; though some slight ones are sometimes taken up in some Parts

of *Bohemia*, *Spain* and *Carniola*: Others are of a very considerable Weight and Bigness. They are fine Stones to look upon, of a dark Green Colour, clouded, though some are of a lighter Green; the Surface feels always greasie. 'Tis reported by some, that this *Nephritic Stone* being grinded into a fine Powder, or prepar'd (probably) by Calcination, or making it red-hot in a Fire, and afterwards quench'd in strong Vinegar, whereby it is easily reduc'd into a subtil Powder, and given to the quantity of a dram and an half, in Fenil or Parsley-Water, doth in a Moment remove the violent Pains in a fit of the Stone; and being taken three or Four times, doth in a wonderful manner dissolve the Stone into Slime, Mud, Gravel, and Crumbles, as they pretend to instance in the perfect Cure of abundance of Nephreticks in *Germany*, where their Wines, and the common Excess in drinking of them, do in abundance of People breed Stones in the Bladder and Kidneys. They add further, That if it be given in too large a Dose, or taken too oft, it breaks the Stone so fast that the Mud and Gravel, into which it is dissolv'd, come down so fast, that they are apt to dam and choak up the ways, as containing too little Room to give Passage to so much Rubbidge,

10. But the Excellency of this *Lapis Nephriticus* consists more in the External Use of it, than Internal, the various Narratives whereof appear wholly incredible. Authors tell you, That being worn on the Wrist, many have been cured by it, who could not receive the least Benefit from any other Internal Medicine. Another Author tells you, That by wearing a piece of this Stone about the Neck, next the Skin of a Person that was miserably troubled with the Stone, which though stubborn to all manner of Remedies,

yet in a short time was so dissolv'd into Gravel, that was not only avoided at the Bladder, but by the Corners of the Eyes, through the Pores of the Skin by Sweat and by Stool also. The same Author confirms the Truth of this, by the like Success upon a great many others. *Menardes lib. de occult. Medicam. proprijet.* adds, That a certain Dutcheff, whom he names, had undergone three Fits of the Stone in a short time; but upon wearing Bracelets made of this Stone, she had been freed of them for ten Years together. The same Author reports further of a Nobleman, that was afflicted with the Stone; who upon the wearing of the Nephritick Stone about his Arm, was us'd to throw off such vast quantities of Gravel, that he was forc'd sometimes to leave it off, for fear the avoiding so much at a time might do him some Hurt. The Excellencies of this Stone are further display'd, by their producing several Instances of Persons, that have been cur'd of those incurable Catarrhs, or Defluctions of Rheum upon the Lungs, of Dropfical swell'd Legs, of any sort of Suppression of Urine, and of Oedematous Swellings in other Parts; all which was effected by expelling Urine in great quantities: And as a Proof that all this was to be attributed to the Virtue of this Stone, they tell you, That upon leaving off the wearing of it, those distempers would return, and as soon cease again, as the Application of the said Stone was renew'd. They further add, That sometimes it would move Stools as violently, as if caus'd by a strong Purgative. But one great Inconvenience they mention the wearing of this Stone is attended with, viz. of causing a very troublesome Itching all over the Body, which would at any time be remov'd by leaving off the Stone for two or three Days, but return again upon the Re-application.

11. Chymists set no less Value upon the Stone, that is taken out of a Man's Bladder or Kidneys, and is call'd by them *Ludus Paracelsi*; the Preparation whereof consists only in calcining it with a vehement Fire into a Salt, and letting it turn into an *Oleum per Deliquium*, by standing in a Cellar, or other damp place. Whatever Virtue may be suppos'd to be in the aforesaid Stone, is to be attributed to the *Sal Armoniac* that is in it; which whether it be not destroyed by Calcination may justly be doubted; and therefore, the Urine newly made by an healthful Young Man, using Wine, doth seem to be endu'd with a greater Diuretick and Stone breaking Power: To which purpose, I have known several Nephriticks have chosen to take several Draughts of their own Urine (as having an Aversion to that made by others, who possibly may be diseas'd of some foul distemper, or other) for many Days together, with good success: For which Reason, Physicians do rather chuse to recommend Goats Urine, which is impregnated with much more *Sal Armoniac*, than that of any other Animal; and herein they all agree, being thereto induced by the manifold successful Experiments upon Nephritick Patients, that it excels all other Diuretick and Stone-breaking Medicines. The aforesaid Urine must be saved, by tying a Bladder to the Goat. Others prefer the Blood of a Goat dry'd, as not only containing a great quantity of *Sal Armoniac*, but its other Particles being dry'd, are hardned into Cutting Acute Sands. Both the one and the other, ought to be us'd in large Doses, frequently repeated, and continued for several Weeks, if any great matter is to be expected from them.

12. In Conclusion, my Opinion touching the Virtues of those pre-numerated Stones is, That Flints being render'd brittle by Ignition, and
Extinction

Extinction in Water, or Small Beer, or Wine, wherein a good Lump of *Sal Armoniac* hath been dissolv'd, and afterwards grinded into Powder, and taken in large Doses in a Draught of the same Liquor, wherein it hath been quenched, may be endu'd with a far greater Power to drive down Urine, Slime, and Gravel, and dissolve the Stone by a long continuatd Use, than any of the most celebrated of them.

13. Bycause those that are troubl'd with Gravel or Stone, are almost perpetually upon dribbling, which is increas'd by all sorts of Moisture they can or do drink, whether binding, stopping, attenuating, laxative, or endu'd almost with any Quality, be it ever so contrary to the Stone, or Gravel; for it all runs to the Kidneys, as being the Parts affected, (as I shall further explain below :) And for that Reason, almost every thing is by those Physicians call'd Diuretick, tho' operating by Qualities wholly repugnant to that sort of Evacuation; hence it is, that *Porcellane* (tho adstringent, and binding, and consequently, contrary to a Diuretick) is in *Consil. Cratonis* mention'd, to expel the Stone to a Miracle; and by *Rondeletius* said to break the Stones of the Kidneys. And *Knot-Grass*, as astringent as it is, is by *Matthiolus Com. 4. cap. lib. 4. in Dioscorid. Solenander*, and *Mizaldus Cant. 4. Distinc. 4.* asserted, to expel the Stones of the Kidneys and Bladder. Also *Rupture-wort*, no less binding, and restraining, is highly recommended by *Rondelet in Consil. 140. Crato. Gesner*, and *Quercetan. in Phar. ma. rest. cap. 10.* for a most effectual Plant to break the Stones in the Kidneys. And *Moss* that grows on the Ground, a potent Restringer, is by *Durandes in Hort. Sanitat. Heurnius*, and *Lonicerus*, mention'd to be a certain Stone-breaker. *Plantane*, that noted Adstringent, by *Mr. Ray*; and *Oaken-Leaves*, a greater Adstringer by

Platerus; and *Cinquefoil*, by *Scroder*, are recommended for Diureticks, and Stone-breakers; besides many other Adstringents that can be nam'd. Moreover, it may be taken notice, that most other Vegetables, Animals, and Minerals are highly commended, tho' specifically appropriated to some part or other: As among Cephalicks; *Pyony* by *Trallianus*, *Dioscorides*, *Durandus*, *Lonicerus* and *Fernelius*; *Betony* by *Galen* and *Matthiolum*; *Calamus Aromaticus* by *Taberna*, *Montanus* and *Solenander*; the Rind of a *Bay-Root*: And among the Pulmonicks, or Thoracicks; *Maiden-Hair* and *Carduus Benedictus*, and all other kinds of Thistles; *Eryngo*, *Figgs*, and *Liquorish*: Among the Cordials, *White Dictamnium*, and most (if not all) Aromaticks or Spices, which you may find mix'd in the celebrated Compound Diuretick and Stone grinding Electuaries and distill'd Waters: Also among Spleneticks, *Tamarisk*, *Spleenwort*, *Roots of Capper*; *Mugwort*, and others among the *Emmenagoga*; most of the Hepaticks; among the Anti Scorbuticks, all or as many as can be found, tho' more particularly, *Black Radish*, and *Horse Radish*; all the Vulneraries, chiefly *Golden-Rod*, and *Speed-well*; besides a great Number of Miscellanies, appropriated to several Bowels, and particular Diseases; as *Birch-Tree*, *Guaiacum*, *Dropwort*, *Grass Roots*, the five opening Roots, and their Seeds, *Burnet*, *Saxifrage*, *Horse-Mint*, *Sampbir*, *Ashen-tree-wood* and *Bark*, the Juice of *Birch-tree*, *Nettle-Juice* and Seeds, *Valerian*, *Orris*, *Elicampagne*, *Bramble-roots*, *Soapwort*, *Bastard Rhubarb*, *Asarabacca*, *Wake-Robin*, *Baife*, *Onions*, *Squills*, *Garlick*, *Cabbage* and *Colewort-Leaves*, *Lovage*, *Garden-Madder*, *Birchwort*, *Restharrow*, *Featherfew*, *Penny-royal*, *Tansie*, *Origan*, *Spignel*, *Poley*, *Calaminth*, *Hyssop*, *Pellitory*, *Germander*, *Groundpine*, *Vervain*, *Southernwood*, *Straw-berry-leaves*, *Water Germander*, *Wild Thyme*, *Skirrets*, *Chamemil*, *Lark spur*, and
St.

St. John's-wort-Flowers; besides abundance of other Roots, Leaves and Flowers, which by one approv'd Author or other are all esteem'd Diureticks, and Stone-grinders, as well as all Carmi-native Seeds, *viz.* Parsley, Fennil, Cummin, Anis, Dill, Carui, Daucus, Cardamom, Marsh-Parsley, Lovage, Sefeli, Gromwel, Parsnips, Macedonian Parsley, Broomseeds, Coriander, Garden-Cress, Basil and Fennel-Flower, the four greater and lesser cold Seeds, of Mallows, and Marsh-Mallows, Cottonseeds, Linseed, and Fenugreekseeds, &c. Lupins, all manner of Vetches, Millet, Red Cicers, Bay and Juniper-Berries, Berberries, Winter-Cherries, Hipps, Bitter Almonds, Peach, Apricot, Cherry, Wallnut, Plumb, and Hazel-Nut Kernels. Among Gums and Rosins; Gum-Elemi, Arabic, Dragant, Olibanum, Bdellium, the Gum of a Cherry, and Plumb-Tree, Gum-Lac, Therbintbin, Amber, &c. Among the Animals, the Ashes of an Hedge-Hog, of an Hare, of Swallows, of an Ass's Liver, of the Feathers of a Goose and a Ring-Dove, and of Earth-Worms; the Skull of a Man Powder'd; the Jaw-Bone of a Pike, and the Parings of an Horse Hoof powder'd; Mouse-Dung, seven or Nine for a Dose; Pidgeon's Dung, Pullet's Dung, Sows (*Millepodes vel Aselli*) Grass-hoppers dry'd, Beetles, the Powder of an After-Birth dry'd in an Oven, the inward Skin of a Cock's Maw dry'd, the Guts of a Swan, the Powder of a young Pidgeon dry'd in an Oven; the Powder of the Bird Wagtail, dry'd by the Smoak of a Chimney; the Ashes of a Troglotite Sparrow, (of which abundance of Authors speak Wonders;) the Blood of a Fox drunk warm, as it comes out of the Veins; the little Bone taken from the hinder Knee of an Hare, (greatly extoll'd by *Forestus* and *Fernelius*;) *Cantharides*, which some Authors tell you, may be given in a total and long continued

Suppression of Urine, caused by the Stone, which if not remov'd, the Patient must die; and therefore a desperate Disease requiring a desperate Remedy, some that have more Courage than Discretion, have adventur'd to give it in a Dose, from half a Fly, unto a whole one, Powder'd, in a Draught of Clarify'd Whey, Emulsion of the four greater cold Seeds, or Skim'd Milk once beat'd up, and grown to be luke-warm, with very ill Success; for considering, that the Patient's strength is reduced to a very low and deplorable State, before it is administer'd, if peradventure the venomous Medicine hath wrought through, so as to strain or squeeze out some Drops of Urine, which appears bloody also, it hath left such a painful burning Strangury, which, with the Addition of the Nephritic Pains, and Defect of Spirits, hath soon put an end to the Miserable Sufferer; so that it had been better to let a Man die, than to kill him: But where that Medicine doth not pass, it doth infalibly torture the Patient out of his Life. However, if any be fond of the Use of them, they must either roast them, and half or wholly calcine them into Ashes, which then will have entirely divested them of their Diuretick Faculty, no other Vertue remaining in them, than what is in the other Ashes; or calcine them by Corrosion, dissolving them in the Spirit of Salt, or Nitre, whereby their venomous Quality is much infring'd, and the Diuretick in a great measure preserv'd. The Toasting is in holding them over an hot Fire in an Earthen Pan, and the stirring them, until they fall almost into Powder, which doth greatly abate their venom, together with some part of their Diuretick Power. In the same manner Beetles (*Scarabaei*) may be serv'd, being not very much inferior to the afore mention'd *Cantharides* in their
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Pissing Faculty. The case being well consider'd, where Diureticks exhibited in large Doses, and frequent Repetitions, do not answer the End, 'tis most certain the true Cause of the Suppression of Urine is mistaken; and consequently give what you please of that kind, it will prove unsuccessful; for a very small Remedy, if it hits the Cause right, doth ever bring sudden relief; and therefore in such Cases, we ought to use our greatest Industry, in inquiring what other Cause may in all probability cause such a Suppression, and not persist in an Opinion, the first Appearance of the Distemper hath put us in. *Cantharides* may be a useful Medicine externally apply'd, but a very suspicious one internally given. I do remember, I have several times made Trial of infusing two Drams of them in a Quart of French Brandy, and being filter'd through a Paper, have given thereof, from one Spoonful to two, in Clarify'd Whey or Ptisane, against inveterate virulent Gonorrhæa's, but I could never find I advanc'd much in the curing of them by that Medicine.

14. I have here got together a large Catalogue of *Diuretics* and *Lithontriptics* in Simples, yet it is not a compleat one; for upon a further search of Authors, it may be increas'd to double the Number, so that as far as I observe, no less than the whole internal *Materia Medica*, even the addition of Purgatives and Vomitives, (which seldom move Stools without provoking Urin) cannot be sufficient to make up a full and compleat List of Piss drivers and Stone-grinders. The cause of increase of so great a Number of these I can assign to no other, than to an incautelous Credit Physicians have given to all sorts of People, that upon pretence of being troubled with this or that sort of suppression of Urine, Strangury, or other symptoms of the Stone, have

Suppression of Urine, caused by the Stone, which if not remov'd, the Patient must die; and therefore a desperate Disease requiring a desperate Remedy, some that have more Courage than Discretion, have adventur'd to give it in a Dose, from half a Fly, unto a whole one, Powder'd, in a Draught of Clarify'd Whey, Emulsion of the four greater cold Seeds, or Skim'd Milk once b*o*il'd up, and grown to be luke-warm, with very ill Success; for considering, that the Patient's strength is reduced to a very low and deplorable State, before it is administer'd, if peradventure the venomous Medicine hath wrought through, so as to strain or squeeze out some Drops of Urine, which appears bloody also, it hath left such a painful burning Strangury, which, with the Addition of the Nephritick Pains, and Defect of Spirits, hath soon put an end to the Miserable Sufferer, so that it had been better to let a Man die, than to kill him: But where that Medicine doth not pass, it doth infalibly torture the Patient out of his Life. However, if any be fond of the Use of them, they must either roast them, and half or wholly calcine them into Ashes, which then will have entirely divested them of their Diuretick Faculty, no other Vertue remaining in them, than what is in the other Ashes; or calcine them by Corrosion, dissolving them in the Spirit of Salt, or Nitre, whereby their venomous Quality is much infring'd, and the Diuretick in a great measure preserv'd. The Toasting is in holding them over an hot Fire in an Earthen Pan, and the stirring them, until they fall almost into Powder, which doth greatly abate their venom, together with some part of their Diuretick Power. In the same manner Beetles (*Scarabaei*) may be serv'd, being not very much inferior to the afore mention'd *Cantharides* in their
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Pissing Faculty. The case being well consider'd, where Diureticks exhibited in large Doses, and frequent Repetitions, do not answer the End, 'tis most certain the true Cause of the Suppression of Urine is mistaken; and consequently give what you please of that kind, it will prove unsuccessful; for a very small Remedy, if it hits the Cause right, doth ever bring sudden relief; and therefore in such Cases, we ought to use our greatest Industry, in inquiring what other Cause may in all probability cause such a Suppression, and not persist in an Opinion, the first Appearance of the Distemper hath put us in. *Cantbarides* may be a useful Medicine externally apply'd, but a very suspicious one internally given. I do remember, I have several times made Trial of infusing two Drams of them in a Quart of *French Brandy*, and being filter'd through a Paper, have given thereof, from one Spoonful to two, in Clarify'd Whey or Ptisane, against inveterate virulent *Gonorrhæa's*, but I could never find I advanc'd much in the curing of them by that Medicine.

14. I have here got together a large Catalogue of *Diuretics* and *Lictontriptics* in Simples, yet it is not a compleat one; for upon a further search of Authors, it may be increas'd to double the Number, so that as far as I observe, no less than the whole internal *Materia Medica*, even the addition of Purgatives and Vomitives, (which seldom move Stools without provoking Urin) cannot be sufficient to make up a full and compleat List of Piss drivers and Stone-grinders. The cause of increase of so great a Number of these I can assign to no other, than to an incautalous Credit Physicians have given to all sorts of People, that upon pretence of being troubled with this or that sort of suppression of Urine, Strangury, or other symptoms of the Stone, have

declar'd a relief they receiv'd from this or that Remedy, though never so contrary, improbable, or preposterous (as you may perceive by the aforesaid recital of Simples, and other Compositions thence fram'd.) without examining to the bottom, the possibility or probability, and manner of acting of such like Remedies, in respect of the Indications, that ought to be taken from the Disease it self, the Causes thereof, the Symptoms, and chiefly from the *Actio lesa* of the Kidneys, which cannot well be performed, without the true Knowledge of the Function or Action of the Kidneys and their *Modus agendi*, which (and indeed the Function of all the Bowels, and the *Modus Agendi*) in my weak Opinion is slubber'd over, or at least very insufficiently discoursed, so that it's scarce possible to give any good Judgment of it. In order to that, I shall presume to set down some Positions, which (to speak modestly) you may please only to take for Suppositions. 1. That the Antecedent Cause of a *lesio mictio* is very oft in the Kidney's, and consequently that the Causes of a total or partial suppression of Urin, a Strangury, a *Diabetes* (which is an *Aucta mictio*) *Ardor Urine* and other symptoms are in the same part. 2. The Office or Function of the Kidneys is chiefly the separation, and excretion of the *superfluous Serum*. By *Superfluous Serum*, I do mean the *Serum*, that hath served the use, for which Nature hath intended it, and after that doth become *Superfluous* (that is excrementitious) and consequently ought and is separated to be afterwards carried off to the Kidneys.

15. But the *Serum* as long as it is mixt with the Blood. I do conceive is the chief alimentary part of it, and into which the whole mass gradually, according to what the parts that are to be nourish'd, do require, is concocted, and as

it were grinded by the continued motion of the Blood in the circulation, before it can be capable to be alimentary or nourishing; for until then the Blood is not fitted to nourish the parts, in a manner not unlike the making of what the *French* call *Consommé's*, and we strong Broaths or Greavy Broaths, into which a whole Joint of Flesh Meat will easily pass by long Stewing, in a close Vessel by a moderate heat, Now, it's obvious to every one, that this Greavy moisture is that, which is the nourishing part of the Flesh, and what doth not pass in it, is little more than gross Excrement. Moreover if you eat Flesh, after it hath been Boil'd or Roasted, this must be grinded by your Teeth, and Stewed in the Stomach into Chyle, which is no more than a gross sort of Broath, the thinner part whereof only doth by the chyliferous Passages pass into the Mass of Blood, which by continual motion, and the heat that's occasioned by motion, is exalted into a red colour, not unlike most Tinctures, that are from a pale colour digested, and exalted into a deep red, in a Sand Bath, by a continued moderate Heat, continually moving and as it were grinding the Particles, that are to be exalted, and there are some Bodies, that by a long and continued Trituration in a Mortar, or upon a Porphir, are exalted to an higher colour.

16. Though now your Victuals are passed into an higher and thinner red Consumées, if I may so term it, yet it's not enough refined and subtilized, to be assimilated to the parts; for then the parts by their agglutination, must look red from the colour of the Blood, which none of 'em do: For the Flethy or Sanguin parts even the Liver it self is not of an essential red colour, but only accidentally so, by the Stagnation of the Blood in the hollow fibres or minute Passages of the parts aforesaid, and the Liver in Dead Bodies; bycause by soaking them in fair warm Water, they all be-
come

come pale, which if the said red colour was essentially in them, after the Blood was assimilated, the red colour would remain. But the *Serum* being enriched with the most exalted Particles of the Blood, seems to me the only proper Nourishment of all the Parts, as doth appear by a Spoonful of it, which being held over the moderate heat of the Flame of a Candle, doth immediately turn into a whitish Gelly, or rather Flesh, continuing to be of the same colour both before, and after Assimilation. As for the Blood, should you put it upon the same experiment, it will turn into a gross deep red friable Sand.

17. If upon reading so many Learned Authors (who indeed seem to do little more than borrow from one anothers Discourses upon Chylification, Sanguification, and Generation of Animal Spirits) I have not met with any Description. (though I have been hammering at the study of Philosophy and Physick above forty years) that can solve the hundredth part of the difficulties that appear to me, I hope it cannot be taken for the least presumption in me, in proposing such sort of Phænomena's, or suppositions, as give me a greater satisfaction in removing my Doubts, and answering any Queries, with a Resolution at any time to own and recall my Errors, judging it no mean Virtue so to do, when and as oft as I can meet with discoveries to convince my self, or be convinced by others more Learned, so that these matters are only set down without any intent to instruct others, but rather to give an occasion to be taught.

18. After all when a Man hath gained his point, so as to be esteemed very Learned and expert by others, and much more by himself, I am very apt to think such a one to have lived very arrogantly Learned in the Histories of *Tom Thumb*, and of *St. George and the Dragon*, and to dye like an ignorant Phanta-

Phantastic. Wherefore I should judge it more necessary for a Physician to acquire to himself a succinct and useful Natural Philosophy, such as may be advantageous to the improvement of Physiology, to inquire into the use of parts, and the true functions of the Bowels; and to be more sedulous in narrowly observing of the true effects of Medicines, be they simple or compound, and afterwards impart his Observes to the World, to prevent others from falling into the same Errors of using uncertain and deceitful Remedies; this as *Celsus* saith, would very well become an honest Physician, and a great Understanding. All, or most liquid or potable Matter, that's admitted into the Body more, than is necessary for the Blood to be supply'd with, doth naturally and by inclination (if I may so speak) flow, and tend or is impell'd by the Spirits, or (if you like the Expression better) by the parts of the Body to the Kidnies, especially if in any wise preternaturally affected; the reason is, because the Spirits (I mean the Animal) chiefly flowing to succour any part that is in distress, and they being the only and chief Impulsors of all the Humours in the Body, it must follow, that all Potables, be they adstringent, gross, thick, thin, sharp, sweet, sour, or indued with any other Quality, must be impell'd to that part, whither the Spirits flow most, which must be to the Kidnies, if preternaturally affected. Hence it is then, that Physick Authors observing all manner of Simples and Compounds, being either potable of themselves, or given in any thing that is potable, do provoke Urin in those, whose Kidnies are any wise preternaturally affected, have taken in so many hundreds of Simples and Compounds to the almost innumerable Number of *Diuretics* and *Lithontriptics*, tho' far from being to be esteem'd as such, either by Reason or Experience; for to assert that Adstringents (as many
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of the reputed *Diuretics* are) do move Urin otherwise, than Medlars do Stools (*per accidens*) *compressendo*, cannot be thought reasonable: And daily Experience doth prove that many *Diuraries*, that are suppos'd to be properly such, are taken in large quantities, by those that are in Health, without adding a drop of increase to their ordinary measure of Urin, as appears by those that have continued the infusion of *Millepedes* in their Drink for a considerable time, and in others that drink great Quantities of *French* and *Rhenish* Wines, without any proportionable increase, and sometimes scarce piss before the next day, which, as I said heretofore, renders the Operation of *Diuretics* very uncertain; whereas other *Evacuatives*, as *Vomitaries* and *Purgers*, have a more certain Operation in most Bodies.

19. As to the *Modus agendi* of the Kidneys in their Function, I cannot Imagine, that the *Superfluous* or excrementitious *Serum* is separated from the Blood in their *Parenchyma*, *colando* (as it is commonly expressed by Physicians) by being strained thro' their narrow Passages, as if it were by a Sieve; bycause the *Serum* is so thoroughly perfused and mix'd with the Blood, (which in many bilious Constitutions is as thin, if not thinner than the *Serum* it self) that consequently the Blood must pass with it, which would always occasion a bloody Urin; so that there must be another sort of separation conceiv'd, to be efficiently performed by the Animal Spirits, which you are not to apprehend to be singly floating in the Nerves, like air in a Bladder, but that they are contain'd in a most subtil piercing *Lympha*, as may be perceived by the Wound of any Nerve, which gives occasion to the said *Lympha* to drop out, and is then called a *Gleet* of a Nerve. This Spirituous *Lympha*, that's perfused through the Body of the Kidneys, doth by its most piercing
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subtil Particles, coagulate the more sulphurous and glutinous Particles from the abounding salin Armoniac, (that are dissolved in the Serum) which by having some repugnancy and contrariety against them, it doth together with the Serum, precipitate down the narrow Chanals of the *Parenchyma* of the Kidnies to the Ureters, whence by stimulation, and their own weight, they are moved to the Bladder. That the aforesaid Function is performed *efficienter* by the Animal Spirits, is proved by several Instances of the same Import, viz. some may remember many Years past, I Publish'd a Treatise, Intitl'd the Case of a Noble-Man (then) lately Deceased, wherein was given an account of a Puncture of a Nerve in the *Plexus Nervorum*, that's near the Groin, occasion'd by the wound of a Sword, that pass'd slantthwart the *Abdomen* down thither, upon which a copious Gleet ensued, and soon after, among other direful Symptoms, a suppression of Urin. This, those Physicians, as Learned and Famous as they were, could impute to no other Cause than the Stone; but they were deceiv'd by their Conjectures, as appear'd plainly afterwards, upon the dissection of the said Nobleman's Body after Decease; his Kidnies, Ureters, and Bladder being found clear of all manner of Obstructions, either by *Mucus*, Gravel, or Stone, though the Kidnies were exceedingly wasted, and shrunk into a much lesser Dimention, than commonly is found in Men. Upon this fatal Mistake, and consequently wrong Indications, the fore-mentioned six Physicians did very boldly perscribe the most powerful *Diuretics* in very large Doses, and long continued frequent Repetitions; until by chance, one of their Medicines having a Power beyond their Expectation, did give a check to the Gleet, that by derivation had deprived so great a proportion of Nervous *Lympha*, (wherein the Animals do reside) from the Kidneys, as not to leave

leave a sufficient quantity in them, to make separation of the salin *Armoniac Serum* for Urin, which therefore ought rather to be called a suppression of the *Serum* in the Kidnies, than suppretion of Urin, and ought not to receive that Name, before its arrival into the Bladder. But what follow'd? The Animal Spirits being return'd to their former Function, and meeting with a great quantity of superfluous or excrementitious *Serum*, (that had not been separated during the long interval of suppression) mix'd with the Blood, that was extremely attenuated and fused by the preceding Diuretics, they separated and excerned such a profluvious Torrent, as caus'd a most violent *Diabetes*, which by my Prescriptions was removed in a very little time. Furthermore you are to take notice, here was not only an abolition, or at least a diminution of the separation of the *Serum*, or Urin, as it is improperly called, but an *Atrophia* or defect of Nourishment in the Kidnies, caused through want of the spirituous *Lympha*, or Animal Spirits; so that as I hinted in one of the former Paragraphs, these are the efficientes (*causæ efficientes*, but in no wise *materiales*) of nutrition, separation, and excretion of all the parts of the Body. Add to the former Instances several others of the Glects, I have before and since observed, occasion'd by the cutting thro' of Nerves in a Wound and Punctures of Nerves in the Arm upon unskillful Bleedings, which tho' they did not effect so intire a suppression as the Puncture of a Nerve near the Kidnies, yet they have caused an evident diminution of Urin, and an *Atrophia* in that part, into which they were inserted.

20. Though in the beginning a *Diabetes* may take its rises from a Torrent of a superfluous *Serum*, that's oft (if not always) taken up by the *Lympha-Ducts*, and continues to have the Smell and Taste of Urin, yet when that begins to assume

a Greavyish, Sweetish Taste, and in Scent resembling that of Beef-broath, I do not much doubt, but a great part of that must be a Gleet of the Nervous *Lympha*, render'd acrimonious, and issuing out of some of the terminations of Nerves, that are inserted into the Kidnies, upon which a wasting doth happen of all the Animal Spirits, and of all the parts of the Body, and that so sudden, that the Patients Strength in a very few days is reduced to extremity, that hath Death following at its heels, which no Flux of Urinous Matter could occasion in so short an interval of time. To confirm this Opinion, I will offer a case of a white swelling (as the vulgar calls it) on the upper part of the back; the Tumor resisted the Touch, as much as that, which is called an *Emphysema* or windy swelling, without being apt to retain a strong impression of the Finger; the Tumor being opened no wider, than the breath of a Lancet, there spouted out a great quantity of a thin limpid salin Humor, exactly resembling that, which riseth out in the Gleet of a Nerve. And though the Orifice was at every dressing cram'd up with a thick close Tent, and over that a thick Pleject dipt in a strong Adstringent Liquor, and over that several compact close Boulsters, and all these again a rowler circumsounded with several circumvolutions round the Body; notwithstanding all, the Gleet would pierce thro' between the distances of the Dressings, that it did not only wet all those Integuments, but the Sheet under them to a great Circumference, in such a manner, that immediately ensued so sudden and exceeding wasting of all the parts of the Body, accompanied with a slow Fever and a Drought, which in very few days ended into Death. The Smell of this Gleet was not stinking, but sweet, the consistency thinner than water, and clear. It's saline Particles render'd it so very piercing, far beyond the power of any *Serum*; so that in all particulars

ticulars it resembled a *Diabetes*, excepting only that the one issued out of some of the Nerves dispersed thro' one of the Muscles of the Back, and the other out of some Nerves disseminated thro' the *Parenchyma* of the Kidneys.

21. Several other suppressions of the *Serum* in the Kidneys I have now and then met with, that were mistaken for suppressions of Urin, occasion'd by the Stone, to the fatal ruin of the Patients, among which I have given an account of one very remarkable in a Treatise called, *The art of curing Diseases by Expectation*. I shall here make a short discourse upon the *Ætiology* of the before cited Disease, wherein the use I make of the *Hypothesis* lately set down touching the *modus agendi* of the Kidneys in the separation and excretion of the *Serum*, will plainly appear. The Patient there mentioned was of a healthful robust Constitution, and fleshy habit of Body, much on Horseback, and scarce at any time long sedentary; his Appetite was much to salt Fish, Pork, Beef, Cheese, and other substantial Food. His Blood upon Phlebotomy in the Arm appeared florid, thick and glutinous, with very little *Serum*. He felt constantly from the beginning of his Illness a weighty pain about his Loins, and pulsatory also; his Urin was Pale, crude, dregish, and turbid, made at pretty long intervals, and in very small quantities, bycause the *Serum* was not neither could it be separated in the Kidneys: For his Blood being ingendred out of a thick glutinous Chyle, and this out of gross, glutinous Aliments, must necessarily be resinous, or thick and glutinous, and consequently as impossible and unfit to mix with an obtuse *Serum*, as Rain-water with Therebinthin, unless something be added to the Water to render it piercing, whose sharp Points may divide, cut and insinuate into the Pores of the viscous Resin. Though the Patient

Patient did drink great quantities of Liquor of one kind or another, the greater part of the *Serum* it produced, was thrown out by insensible perspiration, and very oft by copious Sweats, whilst a small proportion would crowd into the Kidneys, and yeild matter for that little Urin that was made. This glutinous thick and fibrous Blood must be impelled through the Extremities of the emulgent Arteries with great difficulty, and very slow, and with greater difficulty and slowness into the extremity of the emulgent Veins, whereby a fullness and distention must be occasioned, that caused the weighty obtuse and pulsative pain in the Loins, through the defect of a just and sufficient Circulation, which could not but raise great distentions in the hypochonders unequal pulsations, and other Symptoms too many to be here discours'd of by retail. From no other Remedies, but such as obtain a power to remove that clammy, stringy Constitution of the Blood, could any benefit be expected; though on the contrary, improper lithontriptic Diureticks were advised, impelling the Blood more into the Kidneys, and cramping them, whence the pain increased, and the *Serum* was more damm'd up, until at last the Patient being injudiciously sent to the Bath, those hot acidulous Waters inwardly taken, put a quick period to the whole matter.

21. Neither is it always want of saline armoniac *Serum*, or defect of its permixture with the Blood, that are the causes of a suppression or abolition of the separation and excretion in the Kidneys, is evident in an *Ascites*, or Dropsie, where there is saline *Serum* in abundance, and so thoroughly mixt, that the Blood is but little thicker than Water, and so little glutinous, that the least drop will scarce stick to any thing; yet notwithstanding very little *Serum* is evacuated by the Kidneys

into the Bladder, which redounding there fore so much in the Vessels, is thrown into the Legs (which are then improperly called *pedes œdematosi*) thighs, *scrotum*, or the capacity of the Belly. So that the suppression of Urin, as its commonly termed, is the most frequent cause, and which most Physicians do agree unto, of an *Ascites* and *Pedes œdematosi*, succeeding a long Ague, Chronical *cachexia*, jaundice, continuatèd debauches of Brandy, or other strong Liquors, and great Hæmorrhages. Though in most sorts of such Dropsies, the most potent of supposed Diureticks are used, and lixivial Remedies, as Lyes of Broomshes, and others, taken to excess, yet no more Urin, but rather less is expelled, and the Dropsie increased. In some of these cases, I have known monstrous hidropical Swellings reduced by a Month or two's drinking of Bath Waters, which, at proper Seasons of the Year, a Course of *Spaw* would have performed in less time. The cause of this kind of suppression can only be imputed to the Animal Spirits, or the spirituous *Lympha* being vitiated. But in regard that this subject, together with the examination of its Remedy's, that are no less numerous than those against the Stone, would take up too much room, I chose to reserve it to another time.

23. Among that *farrago*, and mixt heap of Diureticks, and Lithontripticks, there remains I should reduce them to a more choice and select number, such as are chiefly in use, and most celebrated among Physicians, and afterwards give you my slender Opinion upon their *modus agendi*, or manner of Operation.

24. The Roots of the most approv'd are the five opening Roots, but more specially *Persly*, *Restharrow*, *black Radish*, and *Horse-radish*; among the Leaves, *White Saxifrage*, and *Burnet Saxifrage*; the chief Seeds, Berries and Fruits, are,

Grumwell-

Grumwell-seeds, Blackdock, Broom, Daucus, Parsley, Fennil, Anis, &c. Winter-cherries, Flips, and Juniper-berries, more particularly Red Cicers; in the number of Animals, Millepedes, or Sows; and among the Stones, Salts, and Minerals, Ludus, or the Stone taken out of a Man's Kidneys or Bladder, Goats Blood, and Goats Urin; Lapis Judaicus; Cineres leporis combusti, vitrum ustum, sal succini, sal prunelle, and Tartearum vitriolatum.

25. The principal of the most famed Compositions are *Electuarium Lithontribon*, and *Electuarium Juslini*, the description whereof you may read in *Cordus* and *Wecker's* Dispensatories, being a rude and unaccountable empirical hodge-pot of abundance of Carminative Roots and Seeds, some deobstruent Roots, most sort of Spices, some Gums, &c. as ill proportion'd, as may be.

26. Among the Magistral Compositions, by this following Syrup *Horarius Augentinus* affirms to have cur'd Six Hundred of the Stone, which is above Five Hundred Ninety and Nine more than I do believe.

R. Rad. Saxifr. Rusc. Eryng. Levist. Onon. Alb. Gram. Fæn. Petrosf. ā ʒss. Raphan. sylv. ʒij. fol. Beton. Pimpin. Alb. Urtic. Puleg. Nasturt. Calam. Polygon. Min. Pariet. ā m. t. fruct Alkek. No. xx. Sebest. No. xv. cort. rad. Lawri. ʒiiij. Sem. Ocym. Bardan. Petrosf. Dauc. Sesel. Mil. Solis. ā ʒij. Uvar. pass. liquir, ā ʒvj. Capil. Ven. Polytric. a m. i. Coq. S. A. in Aq. Capil. ven. lbx. in duplici vase ad lbvj. e quibus cum Sacchar. fin. lbiiij. & Mell. despum. lbij. f. syr. perfecte coct. & aromat. Cinam. ʒj. & Nucki. Mosch: ʒss. m.

27. *Montagnana* recommends the following Electuary to that degree, that he doth avow, there can be no Stone, which by it cannot be broke, and grinded into Sand.

R Sem. Apii. Petrof. gran. Mill. Sol. Rad. Saxifr. Polii. Mont. Aristol. rot. ā ʒj. Lap. Spong. Judaic Lync. ā ʒjʒ. Vitri combust Sang. Hirci. præp. ā ʒij liquirit. pulv. ʒʒ. Oxy mel. compos. Sacchar. alb. ā tʒʒ. Acet. Scillit ʒʒ. M. pro Electuario.

28. The five Opening Roots, Grasse-Roots, Carminative Seeds, with other Roots, Barks and Seeds, like them, are supposed to contain a subtil hot Spirit, or subtil moving Particles, which by putting the Animal Spirits upon a quicker Motion, do by attenuating and rarefying the Blood, separate the *Serum* from it, and consequently make Matter for the Urin, which being driven down, acquires them the Name of Diureticks, that can no otherwise deserve the Title of Stone-grinders, than by oft dripping by or upon Stones, may in Length of Time make little Holes into them, and render them brittle.

29. The *Millepedes* containing a subtil acidulous Spirit, are thought not only by precipitating the *Serum* to be very Diuretic, but also by piercing into the Pores of the Stone, whose Figures seeming to be adapted for the reception of those acid pointed Particles of the Sows, become thereby Stone-breakers. But considering their preparation, they are not only thereby deprived of those few subtil acid Spirits, that fly away by drying them in an Oven, or otherwise, which is one way of preparation; or are wholly destroyed in their Substance and virtue, by the other way of preparing them, which is, by washing

ing them well in Rest-harrow-water, next soaking them thoroughly in *Spanish Wine*, which being poured off, they are to be put into an Earthen Pot or Pipkin, very closely cover'd and stop'd, and then to be dried in an Oven after the Bread is drawn, which if it be not done with a very mild heat, and several times repeated, they will be apt to be stewed, and never fit to be reduced into Powder; others do chuse after washing of them in White-wine, to dissolve them in Spirit of Vitriol, whereby not only the Spirit of Vitriol is obtused and impaired, but the acidulous subtil Spirit of the Sows amortified. This solution is pretended to dissolve the Stone in the quantity of five or six Drops: given in Parsly-water, or such like Vehicle. In my Judgment *Millepedes* need no other preparation, than washing the dirt and slime off them with fair Water, after which they are to be but just broken or very little bruised in a Stone Morter, and about the number of two or three hundred put into a Matraass or Bolt-head, and pouring three pints of White-wine upon them; the Glass Vessel being closely stop'd, they are to stand 24 hours, and the Wine is to be filter'd off, the Remainder is to be dried in an Oven in an open Pipkin, and then reduced to a Powder; hereof from Two Scruples to Four may be taken in nine or ten spoonfuls of the impregnated Wine. That this will prove Diuretick to those, that are Nephritick, is oft observ'd. though I have known them taken, being bruised and steeped in Ale, for their ordinary Drink, for a quarter of a Year together by those, that were troubled with running Eyes, dimness of Sight, Bloodshed, and Inflammations of the Eyes, Dropries, Jaundice, Pthitick, and other Distempers, without any abatement of those Diseases, or causing more Urin than ordinary; so that People need not be so

scrupulous in their Dose in any other Distemper but that of the Kidneys, whether they, as all other Diuretics, are apt to carry all gross slimy Humours, they meet with in their Passage. Many will put seven or eight of 'em in a Morter, bruise them into a mash, and pour a Glass of White-wine upon them, and drink it off without straining. Others hang four or five hundred of them in a Linnen Bag in a Firkin of Ale, and after a Fortnights Infusion, drink the Ale for their ordinary Drink.

30. From a pretended Observation, that Goats Blood will break the hardest of Stones, which is a Diamond, most Physicians prefer it beyond all other Lythontriptics, advising it to be taken warm, as it comes out of the Veins: This requires some further preparation according to the Sentiments of Vulgar Authors, which is feeding a young Goat with Parsly, Fennil, Carrit and Parsnip Tops, Cabbage Leaves, and the like supposed Diuretics, for three Weeks or a Month about the Spring; though others prefer the Autumn, near the Vintage, at which time a Goat is apt to feed much upon Grapes, if he can come at them, whereby they think his Blood is render'd the more Diuretic, and cutting. Being then killed, they prefer the Blood, that comes out of the Veins, about the middle of his Bleeding, before that which flows out first or last. No Blood of any Animal doth sooner coagulate in the Air, and dry into a hard, brittle, and sandy substance. On the contrary, the Blood of a Stag only will not coagulate at all, but continues fluid. Now whether the Blood of a Goat being drunk warm, will not so coagulate in the Stomach, as to occasion a great weight, pain, and indigestion there, whereas the Blood of a Stag consisting of more Volatile piercing Salts than any other whatsoever, cannot coagulate, by reason of the said copious Volatile Salts, which at
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the same time will render it the more Diuretic, and piercing. So that two Drams or more of Stags Blood warm, as it comes out of his Veins, with four or five Ounces of Goats Urin, will make a more potent Medicine, than any of that kind. Many in a Fit of the Stone, and the Cholick thence caused, by drinking their own Urin (which is much worse than that of a healthful Young Man) hath suddenly removed both to a wonder, and continuing the use of it Mornings and Evenings for several Days together, have render'd the Stone brittle; but this sort of Urinous Draught is attended with a great inconvenience of taking away the Appetite, and weakning Digestion. Beyond all doubt the Urin of a Fox is stronger, and more piercing than any of the fore-mentioned, as feeding chiefly upon Blood and Flesh, which abounds much more with Volatile Armoniac Salts, than most sorts of Herbs.

31. As for Alcalious Salts, or such as are by Fire render'd lixivial, as the Ashes of several Animals, their Hair and Feathers, also Dungs, and several Chymical Salts of Vegetables and Minerals, operate by an obsterfive stimulation, or shrinking or contracting the Vessels, whereby they propel the Humours, and precipitate those that are Acid: But all lixivials are experimentally found to abate the Appetite, and extremely disturb the digestion of the Stomach.

The red Cicers (which are no other than red Pease, and little different in substance and Taste from Common Gray Pease) that are in so high esteem for moving Urin, perform it no otherwise than by a flatuous Spirit, whereby they distend the Bowels and Vessels, and rarefy the Humours contain'd in them, that are forced forward to gain more room; which is no more than what a Decoction of Tares, and most sort of Vetches,

Pease, Horse Beans, and Cabbage, and some of them do effect in a more powerful manner.

32. It is to be further observ'd, that all Diureticks, of what kind soever, must be used with the highest Caution in the Stone, Gravel, or any kind of Suppression of *Serum*, or Urin, least by forcing and bringing down gross Humours with them, they cramb and choak up the Passages more than they were; for which Reason they are rarely prescrib'd singly, or in great Doses, and frequent Reperitions, in a Fit of the Stone, Gravel, or Suppression; but either mix'd with those Remedies, that have a Power by their Mucilaginous and Unctuous or Balsamick Particles, to smooth, relax, widen, and render the Passages slippery; as, Oil of Sweet Almonds and Linseeds; Mallows, Marsh Mallows, Pellitory of the Wall, Bear's-Breech, Violet-Leaves, Borrage and Bugloss; or giving small Doses of the milder sort of them, and seldom, &c. And in a Fit, they chuse to confine themselves only to Mucilaginous and Emollient Medicines; also to Balsamick, as Therebinthin, *Lucutellus's* Balsom, Balsom of *Tolu*, of *Peru*, &c. by Mixture with some other Balsamicks, or gentle Diureticks, made into Bolusses, Elestuarics, or Pills, and sometimes Elixirs, and Tinctures; at Intervals advising Clysters, Emollient and Carminative, and now and then Narcoticks; also Half-Baths, up to the Middle, the whole Baths, besides Bags and Cataplasms.

33. The Prevention of the Returns of Fits consists in gentle proper Purgatives and Laxatives, follow'd by proper Diureticks; Mineral-Waters, whether wholly Diuretick, as the Sulphurous Waters at the Bath, *Sunning-Hill* near *Windsor*, *Heywood-Hill* near *Totteridge*, *Islington*, *Richmond*, *Astrop*, *Depeford*, *Henden*, and other Waters, or both Purgative and Diuretick, as *Dulwich-Waters*, *Barnet*, *Epsom*, *Chigwell*, *Pancras*, *Atton*, *Pescot-street*

street at *Windsor, Strettham, &c.* operate by Quantity, Weight, and Stimulation, some by Fermentation and Rarefaction, and others by Quantity, Weight, Stimulation, Fermentation, and Rarefaction.

34. To conclude the whole Matter, I could never yet, among all these fore-mention'd Remedies, find any beyond proper Oleous Balsamick Volatile Elixirs, and Tinctures; and these ought to be framed of Ingredients as various and different, as the Causes of Suppression of Urin, and Generation of the Stone and Gravel in the Kidnies, may be supposed.

C H A P. XVII.

Of Mad'ness.

1. **I** Must own, that among the whole Catalogue of Diseases nothing seems more abstruse, and inexplicable, than that Preter-natural Disposition of the Brain, that is attended with a Mad'ness, either without a Fever, as a *Mania*; or with a Fever, as a *Phrenitis*; or any sort of *Delirium*, as a *Paraphrenitis* with, or without a Fever, which doth affect the Brain only secondarily, and *per Deuteropatheian*, as the two former do primarily, and *per Protopatheian*. In all these are *Lasa* the *Imaginatio*, *Sensus Communis*, (which are with one) and *Memoria*. The Manner or *Modus* of their Lætion cannot well be understood, without first apprehending the manner, how they are perform'd in their natural State, which is the great Difficulty, that neither all my Reading, nor the
Meanness

Meanness of my Capacity can remove. I am apt to conceive, there is properly called (without any Necessity of terming it Analogous) a Sensitive Memory, and Common Sense or Imagination in all Animals, in some more, greater, or more exquisite, and of greater Power, than in others. A Dog seeing a piece of Meat held to him, at a greater distance than he can be suppos'd to smell it, the *Idea* or Impression which at another former time the said peice of Meat, or something like it, made upon his Sight or Smell, is an Argument of Memory, or else would no more run at it, than to a Stone, or a Log; the distinction he makes, that it is neither a Stone or Log, or any thing else, but a piece of Meat, signifies he hath common Sense, and many Dogs though they are not hungry, and cannot eat it, they will run at a piece of Meat, or a Bone, to carry it away into some retired place, and there bury it, whither they will repair, to dig it up and eat it upon the return of their Hunger, all which implies evidently, they are endu'd with Memory, common Sense, or Imagination; which appears plainer, when a Dog hath been observ'd sometime to bark, walk about, return to the place he left, and do several other Actions as if he were awake, in his Sleep, caused by Impressions or *Idea's* made in his wakeful time, that move his Animal Spirits when sleeping; the variety of which motion excited by those impressions, imply Imagination or Common Sense and Memory, which is further confirmed by the Madness or *Mania*, Dogs, Hogs, and other Beasts, feeding upon Carrion and corrupted Food, are subject unto, depraving their internal Senses, so as to commit Violence upon all Creatures, they formerly were familiar with: And lastly their sensitive Passions, (so termed in distinction to those, that are excited by the intellective or rational Faculty) as Love, Fear, Anger, Hatred, is a sign they

they do know, and distinguish, which are Acts of the internal Sense. The Love of a Dog is easily perceiv'd by his Fawning, his Fear is discover'd by the holding a Stick at him, his Anger by biting, and his Hatred, which is a continuat'd Anger, by his Aggreiv'd of Cats, Rabbits, Bears, Bulls, &c. And among all Beasts, the exercise of the Internal Sense, and Sensitive Passions is most remarkable in an Elephant, as may be observed in the several wonderful Relations, very credible Authors do make of them. For a little digression, the affinity of the Subject puts me upon this Query? Whether a Maniac or a Madman biting another Man, or a Dog, may not have the same Influence upon the Man, or Dog that's bit, in causing him to go Mad, and occasioning an *Hydrophobia*, as the biting of a Mad Dog has upon a Man, Dog, or a Hog? Though it be probable, that the venomous bite of either is reciprocal, yet I never heard it confirm'd by experiment.

Without ascending so high as the Intellective Faculty, comprizing the Rational Memory, Common Sense or Imagination, I shall for the present endeavour to satisfy my self in the *Modus* of these sensitive or Animal Internal Spirits, by the following Notion. I will suppose, that all external Sensation (of the external Senses) is performed by an Impression, or rather Pressure, made by the sensible external Object upon the Sensory or Organ immediately, and mediately by that, upon the sensitive Nerve, be it seeing, hearing, &c. Or it may be conceived thus; Sensation is the Perception of any sensible Object: All Perception is by Contract: All Contract is by corporeal Impression, and Impression by local Motion. Here ariseth an Objection, that it's not likely, that a visible Object at fifty or threescore Leagues distance, as the Peak of *Teneriff*, should reach so far, as by Contract, Impression, and lo-
cal

cal Motion, to affect the *Tunica Cornea* or Sight; or that the fixt Stars, which are more remote beyond all Comparifon, ſhould reach the Eye, ſo as to make a corporeal Contract upon it. The Answer contains no difficulty, if you will ſuppoſe that no Object is viſible by it ſelf, but by the light or *Lumen*, and that *Lumen* is a circular Emiſſion or Emanation of luminous Particles from *Lux* (which in reference to the precited Inſtances is the Sun) and is extended as far above the Sun probably, as it is to us below it. The Interception of the ſaid luminous Particles by colour'd, figur'd, and quantitative Bodies, and their being by them in the Interception modified and determined, do thence reach to our Eyes. And why ſhould not Light be as diffuſive, or diſperſive a Body as Air, (filling ſo vaſt a Region as it doth) being much more ſubtil than it, as paſſing through every Pore of it? Light hath Quantity, viz. Longitude, Latitude and Profundity, as much, and as properly, as Air, or any other Body. Being condensed by a thick Convex Glaſs, it hath Weight or Gravity, as might be experimentally found (were the Glaſs artificially weighed) no leſs than Air condensed in a Retort by a Pump. Light rarefies the Air, which Darkneſs condenſeth. The Light, and Colours, which are only Modifications of the Light, (for without Light, all things are Dark, and of no Colour,) make a Preſſure upon the external Tunick of the Eye, (conſiſting chiefly of the Filaments of the Optick Nerve, whence it is this Membrane or Tunick becomes the moſt ſenſible of any in the whole Body, ſcarce enduring the ſoſteſt Touch of any external thing without an exquisite Pain,) which is very perceptible to thoſe, that look againſt the Light of the Sun; this being continued to the Optick Nerve, and thence

thence to its beginning, is what I understand by Sight.

But here an Objection may be offer'd; *Quicquid recipitur, recipitur ad modum Recipientis*. The Sensitive Nerves, as the Optick, Auditory, &c. being all of one Composure, Constitution or Temperament, and the Spirits that actuate them, being all the same, must receive the Impression of Sensible Objects all alike, and after the same manner; and consequently Light must be tasted, or a Sound must be seen. &c. which is false.

To this I give in Answer, That all Sensation is by Contract, that is, by a real or material Action, and not by immaterial *Species*, or Emission of Animal Spirits, which are vain Expressions. The said Contract is the same, and made in the same manner; but the Positions and Figures which it makes upon the Nerves, and its minute fibrilous Parts, are different as much as the Figures upon a piece of Dough, (which is the same in comparison throughout all its Parts,) made by several Stamps; so that the Figures made by a visible Object upon the Pores of the Optick Nerves, and upon the Spirits included in them, are different from those that are made upon the Nerves of other Sences by other Sensibles. 2. That the Sensitive Nerves do differ each from the other in softness, Bigness, Density, and other Qualifications.

3. That the immediate Sensation is not in the Nerves themselves, and the Animal Spirits contain'd in them, but in their invilible minutest Terminations, or subtilest *Fibrilla*, and therefore I assert, that the Sight is in the *Tunica Cornea*, the Hearing in the *Tympanum* or Drum, as much as the Sense of Feeling is in the external *cutis*: For supposing that the *Tunica Cornea*, and indeed all the Tunicks of the Eye, are Expansions of Nerves, and compos'd of innumerable most minute Channels,

nals, that communicate with the Pores, where-
 with all the Humours of the Eye are pervious,
 and all filled with Animal Spirits; the Positions
 they are put into, and Figures that are Impressed
 upon them, are continued to the Optick Nerve,
 and thence to its begining in the Brain. I will
 not here undertake the Task of an Oculist, in ex-
 plaining the Concentration of the Optick Spi-
 rits about the Pupil, and the several Changes of
 Figures they undergo by Reflections in the Hu-
 mours of the Eye, but pass over to the Hearing,
 the Seat whereof (as asserted before, I take to be
 in the Drum, and the Terminations of Fibres
 of the Auditory Nerve in it, upon which Pres-
 sure being made by the Air containing the Sound,
 and continu'd to the beginning of the Auditory
 Nerve, is the Cause of Hearing. Wherefore I can
 in no manner be persuaded, that the Sound made
 upon the Drum, beating the Hammer (*Malleus*)
 against the *Incus* (Anvil,) and propagating the
 Sound to the Internal Air contain'd in the long
 crooked Passage beyond it, is by the Means there-
 of carry'd to the Auditory Nerve; the Use of
 the said Internal Air being rather to keep the
 Drum stretch'd, (as a Bladder is kept distended
 by the Air that is blown into it, and magnifie
 the Sound by the Hollow, containing nothing
 but Air, as you may observe in a Military Drum,
 the Hollownes whereof doth exceedingly mag-
 nifie the Sound that is made upon it by any sort
 of Percussion. That these little Bones placed
 in the Hollow of the Air, are so instrumental
 to Hearing, I cannot well understand, but do ra-
 ther conceive their Use to be for a Stabiliment or
 Fulciment of the Hollow, and keeping the Drum,
 and the Circumvestient Membrane of the said
 Hollow distended. Hence it is, that the Drum of
 the Ear being by moist Weather, or damp South-
 erly and South-West Winds somewhat relax'd,
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the Hearing is dull'd, and not so sharp as in clear dry Weather, when the Wind gently blows Easterly, or North-East. Moreover, when the Drum hath been extreamly stretch'd by a near violent Noise, Thunder or great Gun, so as it cannot return to it's due Streightness, but must fall into a wrinkl'd Skin, the Hearing is either wholly lost, and destroy'd, as it hath happen'd to several, having a thin dry weak Drum, upon a near and extream sharp Sound; or is so obtused, that they can hear but very indistinctly. The like Accident may happen to the Sight, when any very Luminous Body makes too long and too near an Impression upon the *Tunica Cornea*, whereby being too much thinn'd, and distended, it doth cause a Blindness; to prevent which, Nature hath framed the said Horny Coat thicker and stronger, than any of the inferior Tunicks of the Eye, the use whereof (namely the Tunicks) I take chiefly to contain the several Humours, which reflect or turn back the Visible Object, or Pressure made by it, to the *Tunica Cornea*, as the Quick-Silver on the back side of the Looking-Glass stops, or returns the Object to the Surface of the Glass.

The most excellent of the External Senses is the Sight: Its Organ, that wonderful Machine of the Eye, consists of a greater Number of fine smooth polish'd Parts, than any of the other Senses, and is more in Use and Exercise than all of them together; for a Man that is awake, is always seeing, and is commonly accounted awake, because we observe his Eyes are open; so that necessarily a far greater Proportion of Animal Spirits, and the finest and subtilest of them, is consum'd by Seeing, than by all other Senses conjunctly; whence it is, that Sleep being destinated for the repair of the Animal Spirits, we always perceive the necessity of it approaching first in our Eyes, which makes People commonly say,
they

they are so sleepy, they cannot keep their Eyes open; and therefore we do as commonly conclude a Man to be in Sleep, bycause his Eyes continue shut. It is no wonder then, if blind Men can obtain longer from Sleep than others, or that their other Senses are much more exquisite, than those that can see; bycause that great flood of the finest Animal Spirits which the Sight doth require, is distributed to the other external Sensories. Their internal Senses are also much stronger, in regard many blind Men have been observed to have stupenduous Memories, and wonderful Phantasies: Thence it is likewise, that when a Man hath a desire to call any thing to mind, which he had almost forgotten, or to think very seriously upon a Subject, he is apt either to shut his Eyes, or look down to the Ground, whereby a Proportion of the Optick Spirits kept in the Brain, to assist the Internal Senses. Moreover, bycause so vast a supply of Animal Spirits is requir'd to be transmitted to the Eyes for Sight, Nature hath fram'd the Optick Nerves bigger, than any in all the Body, being the only Nerves that have a perceptible Hollownes in them, and thereby render'd capable to give Passage to such great Floods of Spirits: not only to supply for that long continuance of Seeing, but also to supply that variety of Parts, which is greater than those, the Organs of Hearing, Smelling and Tasting do consist of. I expressed, that commonly a Man seeth, or useth his Sense of Seeing, as long as he is awake, by reason of the constant readiness of visible Objects, that will crowd in upon the Sight; he doth not in like manner always hear, or his Hearing is not always in exercise, though he can always hear, by reason there is not always a Sound or Noise in Being, to crowd in upon him. And though it is possible for a Man to consume or spend abundance of Animal Spirits,
by

by hearing a continual Noise from Morning to Night, so as thereby to make him sleepy, yet it seldom doth happen, bycause Nature can better endure the waste of Auditory Spirits, which are incomparatively grosser than the Optick, the loss and wasting whereof being much greater, and a greater abundance being required for the Sense of Seeing is the Cause, why we always perceive the necessity of Sleep in our Eyes, before any of the other Senses, in which also the like necessity is perceptible, in regard, that when a Man grows sleepy, he doth not care to hear, or use any of his other Senses. And though by much stirring or local Motion, and other Labours, the wasting of the Animal Spirits in the Joints, doth occasion Sleep, yet it's always first perceiv'd by weight or drowsiness of the Eyes, bycause they are deprived of their due Proportion of Animal Spirits, that were transmitted to the Limbs, and wasted by continued Exercise.

Before I recede from this Subject, it's convenient I should expl in, what I mean by describing all Membranes to be Expansions of the Extremities of Vessels, in order to make it appear, that the Seat of all the External Senses is in the Membranes, and not in the Nerves. That the *cutis* or ambient Skin of all Animals is a Membrane, cannot be doubted, when it's look'd upon, after it's dress'd by the Tanner or Fellmonger into Leather. That it consists of the Expansion of the Extremities of all the Vessels, as of Nerves, Arteries, Veins and Lymphæducts, is evident by its exquisite Sense of Feeling, and by the least superficial Hurt of a Scratch, (causing sinall owfings of Blood) and by Sweat; the Extremities of the Nerves importing Feeling, as the Extremities of the other Vessels let out the Blood and Sweat. By Expansion, I do not understand a flat spreading out of the ends of the Vessels, as if it were Dough expan-

ded by a Rowling pin, but I do apprehend the said Vessels toward their Terminations, to be divided into thousands of small Filaments, and glewed together in the *Cutis*, by a glutinous substance, (engendred out of the Humours, brought thither by the aforesaid Vessels) that is not so stringy or fibrous, as to be called Flesh. It is scarce denied by any of the Learned, that the Ambient Skin is the chief Seat of Feeling; for though other Membranes, (as also Nerves and Nervous Parts) as the *Periostrum*, the Internal Membrane of the Kidnies, and most of all the *Tunica Cornea*, and next to that the Drum of the Ear, are of a much more exquisite Sense, than the Skin, as consisting of a far greater Proportion of Nervous Expansions, and consequently too tender, are therefore not so proper to distinguish all sorts of Touches or Impressions, as hard, soft, rough, smooth, hot, cold, &c. which Impressions are thence continuated, by the nervous Filaments to the Bodies of the Nerves, and at the same Instant to the beginning of them, and thence to the Common Sense, which doth distinguish these Touches or Tacts into specification of hard, smooth, &c. And here by the way, it may be observ'd from the Instance of some Paralytics, who have lost the Sense of Feeling in some of their Joints or Members, tho' their Mobility or Motion remains entire, that for the most part those Nerves, that proceed from the Brain, bring the Sense of Feeling, and those from the *Medulla Spinalis* are causes of local Motion, which is an Argument, that the Spirits that flow immediately from the Brain, are much more subtil, than those that are deriv'd from the Marrow of the Back-Bone.

What I say here, is not to be understood so generally and absolutely, which made me only intimate, that for the most part, and not all the Nerves

Nerves immediately proceeding from the Brain, do only bring Sense; for some of them do also convey Motion, but withal a Motion so agil, nimble and durable, or frequently repetible, beyond what any of the Spinal Nerves do or can perform, as appears in the nimble, and frequently repetible Motion of the Eye and Eye-lids, of the Tongue, &c. Neither do I exclude the Spinal Nerves, from transmitting Sense and Motion together; but am to be understood, that these fine Spinal Branches of Nerves, and consequently containing Spirits more subtil, that are disseminated through the *Cutis*, being the Seat of the *Tact*, do communicate the Sense of Feeling, and the other that are more gross, and dispersed through the Bodies of Muscles, cause Motion.

That the Sense of Feeling is more exquisite at the ends of the Fingers and Toes, proceeds from the greater concurrence of fine capillar Nervous Terminations in those extream Parts.

The Spongy Membrane of the Tongue, which appears to be an expanded Contexture, out of the Filaments of the gustative Nerves, and of the Extremities of the Coats of Arteries, Veins, Salival and Lymphæducts, is likewise found to be the Seat of the Taste, specially about the Tip, where there is a greater concurrence of Nervous Filaments.

In like manner, I do conceive the Drum of the Ear to be a thin subtil Membrane, compos'd of the Filaments of the Auditory Nerve, and the Extremities of other Vessels, that are inserted into it. The sound that from without makes its Pressure upon the Drum, being enlarged by the Hollow of the Tortuous narrow Passage, is carried by those Filaments to the Trunc of the said Nerve, and thence continued to the beginning of it, and to the Common Sense: So that the sound to me doth not appear, to be carried down

to the further end of the said tortuous Passage, and thence to the Auditory Nerve, no more than the Pressure of a luminous Object upon the Horny-Coat, is continued to the Chrystalline and Vitreous Humour at the bottom of the Eye, to be thence communicated to the Optick Nerve, with which it doth not seem to have any immediate Communication; for as I said before, the Humours of the Eye wrap'd up by the several Coats to keep them together from dropping asunder, seem to me only intended, to modify and reflect the Object back again to the Horny Tunick, whose Contexture is chiefly of the numerous Filaments of the Optick Nerve. The *Tunica Cornea* to be aptly disposed to receive the Pressure of visible Objects, must be kept up distended by the watery Humour (*humor aqueus*) under it, which if it be any thing lessened, either by evaporation in a hot Season, or by a Feaver, so as to shrink or relax the said Tunic, into little wrinckles, the Sight immediately grows dim upon it; and if it wholly runs out by a Wound, so as the Tunic happens to fall into greater wrinckles, then the Sight is wholly lost. In old Men the Sight becomes dim, and so it doth oft upon a continual Fever, by reason that by length of Time, or Age, and by Exiccation, the *humor aqueus* is somewhat diminish'd, and the Tunic thereby is somewhat relaxed or slackned, which makes it seem thicker, and consequently not adapted to receive so vigorous an Impression.

It may likewise be observed, and is now generally so received, that the Seat of Smelling is not in the Olfactory Nerves (I do not mean those that are commonly so call'd by the Antients, that had mammillar terminations,) *Processus mammillares*) which are now taken to be rather carriers off of some Excrements of the Brain) but in the internal Membrane of the Nostrils, through which

which the Olfactory Nerves are expanded in Filaments.

Since then it appears, that Nature having plac'd the Seat of all the other external Senses in external Membranes, as parts to which the External sensible Objects do first arrive, and make their first and most sensible Impression; it is a persuasive Argument to me, that the Seat of the Sight is in the *Tunica Cornea*, or *Sclerotica*, being the most sensible, and consequently chiefly consisting of Expansions of the Optic Nerve, whereas the *Tunica Uvea*, or *Chorooides*, consists more of a contexture of Terminations of other Vessels. It will not be impertinent here to offer a few seeming Reasons out of a great many, that induce me to suppose the *Cornea* the Principal Seat of Vision, without excluding the necessary Concurrence of every Tunic and Humor of the Eye, a great Fault in any of them being as capable to occasion an abolition, diminution, or depravation of Sight, as the least considerable Wheel in a Watch being disorder'd, may cause it to stand, move too slow, or too fast.

I have before asserted, that all Sense is by immediate Contact of any corporeal sensible Object. The Touch, Smelling, and Taste are by single Contact, their Objects consisting of grosser Particles; but Seeing and Hearing are, as it were by a double Contact, that is, by reflection, because their Objects are more subtil, and without a due reflection, could not be perceived by the Eye or Ear; for by Reflection the sensible Object is much strengthened, and consequently obtains a greater force to move the Sensorie. The sound made upon the uppermost Skin of the Drum, would not be so strong, or make such a sort of a sound, were it not reflected by the undermost Skin. Wherefore Light, or any other luminous Object, being a Body the most subtil of all others, must necessa-

rily require a due Reflection, before it's powerful enough to move the Sight. It's allow'd by most, that Light passeth in Rays, that is in Lines of continued luminous Particles through the *Cornea*, and *Humor Aqueus* to the *Foramen Uveae*, where being contracted, or gathered closer, they make a conical Figure.

The *CrySTALLIN* being the most Diaphanous, Compact, thick, and fullest of Pores, is capable to be crowded with a great quantity of luminous Rays (not unlike thick Glass, which by condensing the Rays doth magnify the Light) that are reflected or turned back by the *Humor Vitreus*, which in colour and capacity of receiving luminous Beams, through want of suitable Pores, may aptly be resembl'd to Quicksilver behind a Looking-Glass, reflecting luminous Objects. That those Rays are reflected by the *Humor Vitreus* is seemingly at last proved to me, by the Seeing of those false Appearances of Flies and Motes in a *Suffusion*, which appear to the Sight to be floating in the Air before the Eye, or *Tunica Cornea*: For supposing that the Light carried those little Flies or Bowls directly down to the *Chrystalline*, and thence to the *Vitreus*, *Retina*, and Optic Nerve, how can they appear floating in the Air, or on the outside of the *Cornea*, unless they are reflected back again from the *Vitreus* to the *Cornea*, to make their Impressions there? All Refractions which in Opticks are vulgarly imputed to a *duplex medium* of different Natures, as double, or broken Reflections, as appears in a Stick, that's partly in the Water, and partly in the Air; so that a Refraction not being possible without a Reflection, it follows, that where a Man seeth every thing double, by reason of the removal of the *CrySTALLINE Humour* out of its place by a fall, a blow, or other violence the visible Objects are refracted by a part of the *CrySTALLINE*, that retains its place still, and partly
by

by that which is in that part, whence the *Crystalline* was removed.

To shew, how these sensible Impressions are at the same instance carried to that part of the Brain, where the Internal Senses are seated, is my chief Design, and in Reference to that, I have been the more particular in explaining the external Senses, and the *Modus Sensationis*. I do conceive then, that the Nerves do consist chiefly of congregated Filaments, drawn into length, besides others that are lateral, and that the beginning of the Nerves are Filaments of the medullar part of the Brain, (whereof its only supposed it doth consist) congregated and gathered together into one united Body, which by being afterwards divided into so many lesser congregated Bodies, doth constitute each of the beginning of the Nerves. Wherefore I do apprehend, that an Impression made upon any of the sensories that consist of Nervous Filaments, the impression by continuation (in the manner formerly mention'd in the instance of a Cord) is carried to the beginning of the Nerves, and thence to the united body of the Filaments of the *Medulla Cerebri*, where one Object is distinguish'd from another, which I term *communis sensatio*, or *sensus communis*. I will likewise suppose, that besides those prolonged Filaments, the Nerves are filled with innumerable lateral ones, of several figures, and minute dimensions, the various positions of which being actuated by Animal Spirits into several representations, impressions and figures, if permitted to remain so, is Memory, and when compar'd, and variously composed, one to another is Imagination. So that I do conceive Memory to be the *basis*, and antecedent to Imagination, as common Sense is to Memory, all which I cannot apprehend to be other than various Acts of the *Cognoscitive*, or *Sensitive* faculty. I do verily well know, that applying the same Asserti-

on to Rational Memory, and affirming that Memory is the *basis*, and antecedent Cause of Rational Imagination, admits of a considerable Objection, *viz.* That very oft Persons of the weakest Memory have the strongest Imagination, and the best Judgment, and that the Memory may be lost, though the Imagination and Judgment solely depending upon that, continue entire; which I do deny, for as much of the Memory of things as is lost, so much of the Imagination must be lost; for supposing that you have entirely forgotten the *Idea* of a Horse, Cow, or Dog, you can never frame any Phanſie or Imagination of them; so likewise if your Common Sense is so far abolished, that you cannot conceive or make a distinction of the impressions those Animals made upon the Filaments of your Brain, it is not possible for you to remember them. Probably then this Inference may be made, that the greater Memory a Man hath, the greater must be his Phanſie, Knowledge, Wit and Judgment; which is otherwise observed, in regard that very oft the greatest Memories are not attended with the greatest Wit and Judgment. That they are attended with the greater Knowledge is most certain; for a Man that remembers a great many Objects, or Subjects, must know so many more than another, who doth not remember so many; though for what concerns his Phanſie, Wit and Judgment, they may be quicker, or nimbler, and more agreeable, to right Reason in one of the weaker Memory, but no farther, and of no more Subjects than the number he remembers.

It may be objected against what I asserted before, that Common Sense, Memory and Imagination, are only three several Acts of one Faculty, *viz.* That Mad-men oft retaining their Common Sense and Memory intire, and having only their Imagination depraved, is an evidence they must be

be three distinct Faculties, whereof one being depraved, doth perform depraved Acts, and the others that are intire, do perform Acts as they ought; wherefore since a sound Act, and one that's depraved, cannot proceed at the same time from one and the same Faculty, it follows, they must be three distinct Faculties. I do Answer to this, that the Common Sense and Memory in a Mad-man are depraved, to the same proportion his Imagination is depraved; for to him a Horse may appear to be a Cow, or he may and doth remember things to be otherwise than they were first represented to him. The same Animal Spirits, the same Nerves, and medullar Filaments of the Brain, do all act in the exercise of the internal Senses: And that perceiving of Sensible Objects (which is the Act of Common Sense) the retaining them, (being the Act of Memory) and the composing them variously together (which is the Act of Phantasie) should be other than Acts of the same Sensitive or Cognoscitive Faculty in Beasts, or of the Rational Faculty in Men, I can in no wise apprehend.

In regard the Memory of Beasts (though some of them have a Brain of greater Dimensions than a Man) is so little capable of retaining so many sensible Impressions, which are certainly material; and whereas a Man is capable of retaining of innumerable and infinite impressions of Words, Languages, and all things sensible and intelligible, it cannot be conceived, but that the Rational Faculty, and consequently the Soul must be immaterial; for should you suppose, as commonly its taught, that the Memory is only an Impression made upon, and retained either by the soft substance of the Brain, or upon its Animal Spirits gathered into a soft Cloud; were the Brain of as large an extent as a Church, and could harbour as many Spirits, that, nor these could be capaci-

ous enough to retain a tenth part of things, which a Man is capable of remembering. So that I say, the Rational Faculty must be immaterial, that is, cannot be performed by a material Organ, as the Brain, and its material Animal Spirits; and therefore it's impossible for any Man to conceive the manner of Operation of the Rational Faculty, as long as the Soul continues confin'd and immersed in a material or corporeal substance: And were the Soul of Man material, as some do believe for want of true Reason, it could be capable of discerning and remembering no more Objects, than the Soul of a Beast, the Brain of some Beasts being as organically and aptly framed, as the Brain of a Man, and in some the Animal Spirits being much more fine and subtil.

From this Discourse I do infer, that the Cognitive internal Senses, (which are subservient to the Rational Faculty, comprehending a Rational or Intellective Common Sense, Memory, and Imagination) in a *Mania* are only affected; for the Intellective being immaterial, can in no wise be subject to be affected by any thing that is material; neither could any material Remedy have a power to act upon an immaterial Disease of a Man, as Mandels must be termed, were the Intellectual part touched, more than upon the immaterial Madness of a Devil.

This premis'd, I am of opinion, that the Animal Spirits in the Brain being irregularly and violently mov'd, is the cause of a *Mania*, by putting those sensible Impressions, that are made upon the lateral minute Filaments of the Brain, into a disorder, and changing their Positions, which occasions the Common Sense, Memory, and Phantasie to be depraved: That the Fury and Heat, which Maniacs are so frequently impell'd into, are occasion'd by the continued,
quick

quick, and impetuous Motion of the Animal Spirits, which thereby are grinded into very sharp, cutting, piercing Points, that disunite the lateral Filaments, stimulate, prick, cut, and pierce those Filaments of the Medullar part of the Brain, and of the Nerves, and by the foresaid rapid Motions, the whole sensitive Machine is put into a Flame: That their continual wakefulness proceeds from the abundance of Animal Spirits (the cause of which shall be explain'd below) the Brain of Maniacs is furnish'd with, the vast of Spirits, their paucity, Feebleness, and slow motion, giving commonly occasion for Sleep. That they are in no wise subject to Fevers, taking Cold, Obstructions of any of their Bowels, or scarce any other Distemper, or any preternatural Symptom, except over-wakefulness, (*vigilie immoderate*) is to be imputed to the Rapid Motion of their Animal Spirits, attenuating their Blood, promoting of its circulation, rendring the Body pervious, and free from all Obstructions of the internal and external Pores; their Blood being more salin, and dry, than sulphurous, is not so much exposed to a febril Putrefaction: Tho' it must be observ'd, That very oft before Maniacs fall into their Distemper, there is a great Calm and slowness of Motion in the Animal Spirits which occasioneth a very slow motion in the Humours about the Bowels, and very oft a Stagnation, that disposes them to a particular sort of Putrefaction, whence gradually proceeding some putrid, salin, sharp, acuated or pointed Particles, (that oppress the Animal Spirits) dull their Motion, and cause such a disorder in their Blood, that is productive of such Symptoms, which commonly Melancholick Hypochondriacs are troubled with, as Sighing, heavy sorrowful and desponding Thoughts, palpitations of the Heart, Frights, Fears, Slowness in stirring, Languidness, &c. These forementioned putrid salin Particles, as they arise,
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and separate gradually and are afterwards mix'd with the whole Mass of Blood, increase the prenum-merated Symptoms, until at length great Crowds issuing thence, do so violently move, stimulate, impel and hurry the Animal Spirits into a Tempest and Fury, whence soon after those Maniacal Symptoms do follow.

A *Mania*, or Madness, though it be only a Symptom, and the chief and most urgent of the others, that are associated with it, is as all other chief Symptoms, commonly called a Disease, by a *Metonymia Adjuncti pro subjecto*. By the same tropical manner of speaking a Fever, or rather Fervor, is called a Disease, from the burning heat that doth oft accompany it, though it be but a chief Symptom. This I thought fit to observe, to prevent your judging it a mistake in me, in calling a *Mania*, and many, if not all Symptoms a Disease, which is a very common way of speaking among most Physicians.

That in Maniacs the Functions of the Bowels, and other parts are performed with greater vigour, than in others, appears by their digesting almost anything that's edible, by their copious Excretions by Stool, Urin, and Sweat, by their wonderful and almost incredible strength of their Limbs, so as sometimes the strength of a Mad man, shall exceed the united force of four or five Men, that have their Senses intire. Their Hearing, Seeing, and other Senses are much more exquisite (though depraved) than in others, in regard Madmen will hear the least Noise, and see the least Object, beyond what they could do when they were *Compos*. The Cause and Reason of all which is the abundance of Animal Spirits, that are contained and engendred in Mad-men, inasmuch that it may be presumed, the greatest part of their Blood is Spiritualiz'd, or converted into Animal Spirits; for without supposing this vast plethora of
Spirits,

Spirits, it's impossible they should be always, Night and Day, using their Tongues and Limbs in so furious and violent a manner, without any long intermissions of Rest or Sleep. This Plethory riseth from the almost perpetual, violent, quick and nimble motion of the Animal Spirits, piercing, grinding, and subtilizing the greatest part of the Blood into Spirits similar to themselves.

If a Madman, after he hath continued in a long raving Fury, falls into a long intermission of Silence, hardly to be provoked out of it, that must be ascribed to the great expence and waste of the Animal Spirits, by his long fit of Fury, which he is forced to repair, by giving the remainder of his Spirits time to breed more.

His reciprocal seasons of Madnes, intermix'd with intervals of Rational Discourse, in some for a longer time, in others shorter, may be attributed to the variety of motion in his Spirits, which sometimes moving regularly and naturally, are the occasion of the latter, to wit, his lucid Interval, whereas he is impell'd into the former by Fits, as frequent, as there is a new fallying out of a crowd of the forementioned putrid saline Particles, mixing with the Blood, and upon its arrival to the Brain mixing with the Spirits.

I have been obliged to make an expatiation in the Theory of the external Senses, to the end I might more easily explain the manner of natural Operation of the Internal, thereby in some sort to apprehend the manner of their preternatural Operation in a *Mania*; which I did the rather, that I might give my self the occasion of examining the practic part, relating to the curing of Diseases of the Eyes and Ears, as well as of the Brain. If I have not been so successful in these most difficult and abstruse Matters,

as I could wish, or as others of a much better capacity might have been, I hope I may be excused for my attempt, were it only for proposing the Subjects, and giving others an opportunity to exercise their Industry and great Abilities. However, I shall presume to give you an Account of what use I make of the said Theory.

First, in relation to the Eyes, the *lesion* of the Sight is either caused by the fault of the Optic Nerves, and their expanded Filaments, the decay, waste, and vitious constitution of the Animal Spirits, or the vitious disposition of the Tunics of the Eye, but specially of the Horny-coat, or by the fault of the Humours, I mean the aqueous, vitreous, and chrystaline, whose Office I did only suppose is, to support and keep the Tunics justly distended, and by Reflection, to return the visible Impression to the *Horny-coat*.

I do only pretend here to take Notice of some defects of the *Horny-coat*, the *Humor aqueus*, and Optic Nerves, for should I here insert, what may be practically observed, concerning all or most Diseases that are incident to the Eyes, and their several Coats, Humours, Muscles, and Optic Nerves, a large Volume would be scarce capacious enough to contain it.

The forementioned Tunic being of too thin a texture (from the tenuity of the Nervous Expansion and the extream subtility of the Optic Spirits) and the tenuity of the Aqueous Humour making too little resistance to the luminous Particles coming from a great distance; the said luminous Particles being too much thinned, and losing some part of their Lustre, and thereby not congregated enough, by reason of the rarity of the foresaid Tunic and Humour, consequently have too little force to act upon them; whereas in a Tunick, that is of a more compact texture, and consisting of more numerous, though much streighter Pores, Rays are much easier gathered

ther'd together, and consequently may operate from a greater distance. This laxity of the said Tunic and Humour is two fold; one natural, and the other adventitious, by reason of some Disease, as a Fever, Consumption, &c. The former is in no ways to be meddled with. The latter either ceaseth upon the removal of the Disease, that caused it, or if it should continue, may be remedied by washing the Eyes daily with Water, wherein a very little Saltpetre, or rather *Sal Prunelle* hath been dissolved; or you may two or three times in a Day drop into the Eye, a drop or two of this Solution, viz. two Grains of white Vitriol dissolv'd in two Ounces of some clear Well Water; wherefore you are to take notice, that most common Eye-Waters, that are cry'd up for Sovereign Remedies against all, or most Diseases of the Eyes, are strictly to be avoided in all short Sights, whereby they would be rendered much worse. Such sort of Waters are usually distilled from Fennil, Celandine, Eye-bright, Rue, Vervain, Male Pimpernel, Hogs Fennil, &c. Besides, in short Sights the Distention of the *Horny Tunic* is too weak and slack, by reason of the loose Texture, and thinness of the said Tunic and Aqueous Humour, upon which the feeble and almost spent Rays, that arrive from a great distance, can scarce Act or exercise such an Impression or Motion, as is necessary for Sight. On the other hand, where the said Tunic is of a good Texture, and fully distended, Objects are perceptible from a much remoter distance. . But where the forementioned Tunic is grown too thick, and consequently less diaphanous, and less porous, that Sight is neither good at a distance, nor near, as it's oft observ'd in old Folks. Moreover in those the *Humor Aqueus* is very much thickned, so as to deny a full and free Passage to the luminous Beams; the

the said Humour is also become less turgid, and of small compass, whereby the *Horny Tunic* becomes less distended, and a little flatted, so that the visible Object must necessarily act very feebly upon it, the Rays not being sufficiently congregated, through its defect in Convexity. Add hereunto, that in them the Optick Spirits are grown few, gross, and fumous, which renders the Perception of the Object dim and cloudy.

To preserve the Eye-sight, is to retard, and hinder it from becoming such, as it is in old People; that is, 1. By rendring the Animal Spirits light, subtil, clear, and more copious. 2. By attenuating the *Horny Tunic*, and the watery Humour. 3. By avoiding straining of the Sight, thro' exercising it long and often upon very small, shining, disperling, or very distant and remote Objects.

The first of these means consists in keeping the Body clean of gross Excrements, which gave so frequent Occasion to the Ancient Physicians, to invent Pills peculiarly appropriated to the Sight, and distinguish'd with Names referring to it; As *Pil. Lucis majores* and *minores*; and others as *Pil. Aurea*, *sine quibus*, *Chochia majores* and *minores*, &c. I cannot think any of these Compositions hath any more regard to the Eyes than to the Toes; but bycause in the Mass of *Pil. Lucis maj.* and *min.* is contained a very small proportion of *Eye Bright*, mixed with Aloes and *Colocynthis*, together with a great many contrary Ingredients, which serve for nothing else, but to clog the Medicine, and all this is to be made into a Paste, with Juice of Fennil, they thought they had reason enough to expect from them and the others forementioned, all the Virtues whereby to preserve Sight, and to cure the Eyes of all Diseases past, present, and to come; but what is a greater wonder to me is, that still there
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are many Physicians, that yield a very great respect to the said Pills in Diseases of the Eyes, whereas most certainly a good *Extractum Rudit*, or *Catholicon* well composed, and made up, will serve abundantly better, cheaper, pleasanter, and more effectually in any Disease, that may require strong Purging; so that were all those Colocynth and Scammoniack Compositions, which modern Dispensatories are cram'd with, thrown out, it would be much more profitable to the Patient, and less troublesome to the Apothecary.

I should apprehend it a mistake in my self, should I pretend to render a purgative Medicine specifick, or appropriated to any particular Disease, or Part affected, by adding to it a specifick alterative, expecting by that to lead the purgative to the Diseased Part, and to virtuate it by that to Purge, or draw only, or chiefly from that Part, particularly the Humour, or Cause, that doth affect it with a Disease; as in case of a Disease in the Eyes, for the reason aforesaid Physicians seldom omit to mix *Eye-Bright* with their Purgatives, in Imitation of the forementioned *Pil. Lucis majores*, and *minores*; or in case of a Palsie, Convulsions, Apoplexy, or any other general Disease of the Head or Brain, to add *Caster* to some strong Cathartick, and the like almost in all other Cases. All Purgatives ought to be reduced to the least Quantity, to render 'em most acceptable and easy to be taken by the Patient.

2. The Purgative by being mixt with a specifick Alterative, doth wholly drown and destroy its Virtues, as much or more than the Purgative is infringed and abated in the Operation by it.

What I mean by keeping the Body clean, is to take now and then those Pills, which are recommended in the foregoing part of this Treatise; without adding the least grain of Eye-bright to

them. Besides this, it's necessary to abstain from all gross windy, steaming Meats, salt Fish and Flesh, sour Sauces, strong Drinks, feeding chiefly upon Meat of a good Juice, and that yeilds but little Excrement, and using Drink that's clear, well digested, and moderate in strength. Nothing hitherto hath been observed a greater Enemy to Sight, than Wormwood, which being used in Drink, or otherwise, hath been the occasion of dulling the Sight in some, and of Blindness in others; yet notwithstanding, *Dioscorides* commends it for a sharpner of the Sight, and therefore little Credit ought to be given to these old Authors in many of their Characters. Onions, Leeks and Garlick, come not much short of that Plant. All raw Sallads are experienc'd hurtful to the Sight, by contributing Matter for Crudities, and being windy. Weeping in Women, a long, sorrowful and melancholic Disposition, and too much Gravity do lessen, condense, and blunt the Optick Spirits, which ought to be serene and agil. Living in a dark House in a foggy Air, works Effects little different from the former. Too much Sun-shine reflected from a sandy Ground, hath been the Cause of Blindness in many that live in *Spain*. Very hot Countries contain more Blind, than those that are temperate, or cold, though in the latter they are not commonly quick or far sighted, excess of Cold condensing the Optick Spirits too much. As weeping and great Debauches do oft furnish their Eyes with an outward glazie Coat, so they do not seldom according to the common Phrase, cry and drink their Eyes out. It may probably be said, *Visum debilitant Balnea, Bacchus, Amor*, as well as *Corpora*; And on the other hand, whatever may be said to preserve the Body in Health, doth preserve the Sight. Smoak and Dust are none of the least Enemies to the Eyes.

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The attenuating the *Horny Coat* and the *Humer Aqueus*, (which at the same time attenuates the Optick Spirits, depurates and renders the foresaid Tunick and Humour clear and diaphanous) is commonly attempted by inward and outward Medicines, that have a Power to discuss Winds, and move Urin, proceeding from their subtil Particles, that are supposed to be very attenuating, and consequently diuretick, and discussive. These Medicines are usually called *Oxydercica*, that is, Sharpners of the Sight, from ὀξύ *acutum*, [and *ἄσπερον* *video*. Such are accounted all the greater and lesser hot Seeds, but chiefly *Fennil* and *Daucus*, *Elicampane*, *Orange-Peell*, *Masterwort*, *C. r. amicus*, *Virginian Snakeweed*, *Cubebs*, *Galangal*, *Rad. cyperi longi*, *Ḫ rotundi*, *Paradise Grains*, *Cardamum*, *Zedoary*, *sem. fileris montani*, *sem. seseli Massiliensis*, *Nutmegs*, and most sorts of Spices. On the other hand, all Antiscorbuticks, specially *Mustard* and *Garden-Cresses*, are accounted pernicious to the Eyes; and *Ginger*, *Pepper*, and *Parsley*, as discutient as they are, offend the Sight, and so do most Sowrs. The following are esteem'd specifick *Oxydercicks*, viz. *Eye-bright*, the greater *Celandine*, *Vervain*, *Fumitory*, *Valerian*, *Avens*, *Rue* and *Clary*, than which last, nothing can be found a greater darkner of the Sight, and more offensive to the Eyes; for being put into Wort to ferment with it, renders the Drink the most inebriating, and discomposing all the Senses, beyond any other Vegetable, except *Darnel*. And yet being outwardly applied, is very excellling in thinning the Coars of the Eyes, and watery Humours, and very discutient in clearing the Sight from Dimnells or Cloudiness. As great an Author as *Platerus* is, he recommends *Radishes* and *Mustard* for specifick Sight Sharpners, than which common Experience doth most certainly convince us, nothing can be a greater Enemy to the Sight;

Which informs us, that we are not to take things upon trust so slightly, as most Physicians and others are apt to do, without comparing them with the Rules of Experience and Reason.

Those forementioned Aromaticks, Seeds and Roots, are Discutients of Wind by their subtil Particles, which they perform by attenuating of gross Humours into Bubbles, which breaking, emit those Winds, or crude mix'd Aery Spirits, that afterwards are sometimes avoided upwards or downwards, or are impell'd into the Vessels; these mounting upwards, do for a time much disturb the Sight, until they are either discuss'd, by the Spirits that are in the Eyes, and assisted therein by a further continuation of the use of the said attenuating Aromaticks, and Seeds. Hence it is, that very oft those attenuating Oxydericks do render the Sight much worse, and sometimes in Phlegmatick Constitutions usher in Blindness at first, though oftentimes also the continuation of them may discuss the Winds they first rais'd; wherefore a great deal of Caution ought to be used in the Application of them: So that it appears plainly, that the same Oxyderick may remedy the Sight, and keep off Blindness in some; though in others they most certainly cause Dimness of Sight, and Blindness.

Diureticks, by carrying off the Salts of the Blood by Urine, (they by drying up the Aqueous Humour, and corrugating or condensing the *Horny-Coat*, thicken and lessen the former, and harden the latter in Old People, whose Eyes therefore do appear thick, dull, flat, slow in Motion, &c.) have been experimentally found very advantageous, not only in preserving and meliorating of the Sight, but in preventing and removing many Diseases incident to the Eyes. Among those *Millepedes* or *Sowes* moderately used either in Ale, or otherwise, are universally, and by common Experience

perience, preferr'd beyond all others; for being copiously furnish'd with very subtil penetrating light Spirits, they do not only carry off Salts by Urine, but attenuate and discuss what is gross in the Watery Humour, and all the Tunicks, and subtilize the Animal Spirits; which Qualities seem to render them specifick to the Eyes.

Some do use *Ground-Ivy* in their ordinary Drinks, to preserve their Sight, to no great purpose: But in *Valerian* and *Vervain* (a quantity of one or both being added to the Wort before, or while it is working) many do affirm to have experienc'd a great Power, in preserving their Sight, and removing Dimness. To mend the Taste of such sort of Ale, a moderate Proportion of *Elicampane-Root*, *Orange-Peel*, or a few *Daucus-Seeds* might be added. *Bean Stalk* Ashes, to the Quantity of five or six Ounces, if they are clean, put to a Firkin of Small Ale after the working, jumbling them well together, and allowing them four or five Days to settle to the Bottom, did they not blunt the Taste of the Drink so much, would prove more powerful, than any of those Vegetables.

As for the Externals, I should be loth to advise any Person to compound Eye-Waters, to preserve his Sight: The washing the Eyes daily with clear Spring or Rain Water is sufficient. Water that hath stood long in a Leaden Cistern, is accounted hurtful, there rising a very sharp offensive Steem in length of Time from the Lead, that mixeth with the Water.

Those whose Eyes are weak from their Birth, ought to avoid tampering with any sort of *Oxydencicks*, Internal, or External, their Weakness of Sight depending much upon a natural Laxity of the Optick Nerves, and Tunicks, their Humours of the Eye being also thin, and their Optick Spirits loose, and not compact; all which

may be easily render'd worse by uncertain Remedies, and never or seldom better, though their Growth in Age, Change of Climate, or Diet, may considerably contribute towards the Melioration of their Sight. A Weakness of the Eyes, that Sickness might have left, doth oft go off with the Weakness of other Parts, by the Recovery of Strength of the Brain and Bowels. But if that Weakness should singly remain, then besides due Evacuations, general and particular, recourse may be had to the proper Internal and External *Oxydericks*, which ought to be chosen with the strictest Caution.

Among Diseases of the Eyes I do account a *Suffusion*, *Cataract*, and *Gutta Serena* the most dangerous; and an *Ophthalmia* or Inflammation, the most painful, and oft an Antecedent Cause of the others.

A suffusion, or *Hypochyma*, seems to me to proceed either from some subtle Winds, or Windy Spirits, falling out of the Arteries, or Pores of the Nerves, and breaking into the Watery Humour of the Eye, there causing very minute Bubbles of various Figures, which being actuated or moved by the Luminous Rays, (for when a Man's Eyes are shut, whereby the said Luminous Rays are excluded, he is not in the least sensible of them,) do produce those Appearances of little Boulds, Flies, and other small Shapes, floating or flying to and fro before the Eyes.

There are commonly observ'd two kinds of those Suffusions: The one arising from Crudities of the Stomach, or Flctuous Hypochondriack Humours of the Bowels, is not durable, though oft returning by Intervals. Those little Figures, that do deceitfully impose upon the Sight, moving much quicker, than in the other kind, and meeting together, join into a Cloudiness, that quickly vanishes, by reason that those Windy Spirits, which issue through the Pores of the Arteries, and being
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of a Vaporous or Watery Composition, are much lighter, move nimbler, and are much easier discuss'd, than those Windy Spirits, that are press'd out of the Pores of the Nerves, which being of a more Saline, tough, heavy and compact Mixture, consequently durable, and constantly abiding, (because not easily discuss'd,) make Representations of larger Figures, and are moved much more slowly; and consisting of clammy or viscous most minute Particles, are very apt to unite; whence it happens, that their Representations are dispos'd to grow daily bigger. These Viscous Windy Spirits are subject to be precipitated, or impell'd to the Pupil, or *Foramen Uveæ*, by the constant passing of the Luminous Particles in Beams or Rays towards the said *Foramen Uveæ*, where they are concentrated, or gather'd together in the Figure of a Cone, the said *Foramen* forming the narrow End of the Cone, as the *Cornea Tunica*, doth the broad. So that they are the said Viscid Nervous Winds, impell'd by the continual passing of the Luminous Rays to the *Foramen Uveæ* into an united Body, which at length do form that preter-natural Skin, called a *Cataract*, being a discernable Cause of Blindness, in Contradiction to a *Gutta Serena*, the Cause whereof is not externally discernable, but commonly ascrib'd to gross Humours, obstructing the Hollow of the Optick Nerves, and stopping the Influx of the Optick Spirits. I cannot but wonder, whence those gross thick Humours should be sent, or how convey'd; not from the Medullar part of the Brain, where, Arteries and Veins are scarcely discoverable and whose very Compact Substance is no more susceptible of any thing that is gross, than the Beginning of the Optic Nerves: Besides, such sort of slimy gross Humours might easily, in the beginning of a *Gutta Serena* be

melted down, and carry'd off by the common Head Purgers, which are generally very strong and churlish; as *Pil. Cochia maj. and min. Pil. Arabic. e duobus. Elect. Indum maj. & min.* and all their compounded *Hiera's*. So that to me the *Ætiology* of this, and almost of all the rest of the Diseases of the Eyes, seems *gratius dictum*.

It is more apparent to me, that the most frequent cause of a *Gutta serena* is the Nervous *Lympha*, (which is the Vehicle, or rather the *Materia* constituting the grosser Particles, which united with the subtiler and most subtil Particles, separated out of the best and finest parts of the Arterial Blood. do compose the Animal Spirits) being grown too gross, thick and viscous in the Optick Nerves, stagnates there, and makes a Dam, thereby hindering and putting a stop to the influx of the Animal Spirits, from the Brain to the Eyes, which ought not to be termed Optick Spirits before they arrive thither. By this supposition, a *Gutta serena* seems to be a Palsie (*Paralysis*) of the Optic Nerve; all other Palsies, whether universal or particular, being engender'd by no other cause, than by the stagnation of the Nervous *Lympha*, (being render'd gross and viscous) in the beginning of the Nerves in the forraer, and in particular Nerves in the latter. After a proper Purge or two to clear the Passages, and make room in the Vessels, how little advantage can be expected from frequent Cathartics, though violent, or any other Remedies, vulgarly in use against a *Gutta serena*, or any other Palsie; may be easily understood from the forementioned *Hypothesis*; for should you purge *ad infinitum*, you can never pretend to draw off that coagulated Nervous *Lympha*, but rather by drying all the Humours in carrying off the moisture and thinner part, you must necessarily render

der it worse, which by long continuance doth turn into an hard substance, much tougher than the Nerve it self, or the toughest Leather, and consequently must be incurable. And much less advantage can be hoped from any of the celebrated Eye-Waters; some whereof are pretended to have cured those, that have been Blind Twenty Years, and go under the Name of some Queen's or Lady's Eye-Water, all which is no more to be credited, than the Achievements of a Knight Errant; for you may as reasonably pretend to break the Stone in the Bladder by applying *Millepedes* to the Soles of the Feet, as to dissolve a *Gutta serena* by an Eye-Water, if you consider the great distance from the *Horny Tunic* (to which they are to be apply'd) to the Optic Nerve, the several Coats and Humors of the Eye, the extream tenderness and sensibility of the said Coats, and the necessity of an extraordinary piercing Remedy, which, sure I am, is not greatly to be found in those Aromatics, Seeds, and Oxydercic Leaves, of which most Eye-Waters consist, and are very repugnant to the qualities of Aloes, Honey, *Tuthia*, white Vitriol, Sugarcandy, Sugar of Lead, and other Materials, that are oft ridiculously enough added to them. I do know, that sometimes, once possibly in two or three Ages, a *Gutta serena* hath been removed by an accidental Salivation, othertimes by a most violent Passion of Anger, Joy, and sometimes by a sudden frightful Object, throwing the Animal Spirits into an impetuous motion to avoid the same, or by a sudden violent Fever, that by rarefying all the Humours and putting the Animal Spirits into a violent motion, the viscous Damm hath been pierced through, and violently expell'd. But these are means, that if imitated, do seldom or never attain the success hoped for.

Besides

Besides the Cause forementioned, Convulsions, and Tumors of the Muscles of the Eye, near the heads of them; have caused a *Gutta Serena*; the former, by contorting the Optic Nerves, and altering the Figures and Positions of their Filaments, which I do remember occasioned a *Gutta Serena* in the Lord G's Lady, when living in the *Pall-Mall*, upon the taking of *Vinum Benedictum* (*Maledictum* sometimes) prescribed by her Physician, at the request of the Patient I presume, and probably ill prepared, and overdoled by the Apothecary, contrary to the directions of the Doctor: The latter perform this unfortunate effect, by compressing the Optic Nerve, which sometimes is removed, but not always.

A *Gutta Serena* may sometimes be removed with great difficulty in the beginning, *premissis universalibus*, by potent, sulphurous, and oleous internal Medicines, which under that shape, may preserve a great part of their Virtue until their arrival to the Brain and Nerves, and possibly some of them may externaly be let in by the Vessels of the Head, but then those Internals must be frequently exhibited in large Doses, and continued for a long time, even to the brink of a Fever, or some other contrary Distemper; and this is the only Method to cure all other sorts of Palsies, which I have followed more than once.

A *Cataract* is best cured in the beginning, and whilst it continues to be a *Suffusion*. Internal means are as necessary as external. Sugar of Lead, being well prepared by digesting Spirit of Wine, with it, and abstracting it afterwards by distillation, and dissolv'd in a convenient Vehicle, is not only an excellent Topic in this Disease, but in many others of the Eyes, especially in an *Ophthalmia*, *Taraxis*, and *Chymosis*; Ulcers of the Tunics, and *Epiphora*, &c. for there is a Spi-

rit in Lead, being well corrected and managed, is the most discutient and penetrating of any in respect to the Eyes; besides, the Salt contains a great Sweetness, and is endued with many singular Virtues.

An *Ophthalmy* I do suppose to be occasion'd by Evaporations of the *Lympha*, contained in the capillar *Nervuli*, disseminated in the *Tunica conjunctiva*, being grown very sharp and corroding, (as is formerly mentioned) which Evaporations being condensed into small drops or gleets, and meeting other Juices, cause an effervescency and coagulation, to which pain *supervening* invites other Humours, that together produce such a sort of Inflammation. I have oft observ'd, that the application of cold Medicins (as whites of Eggs, Conserve of Roses, and other Restrictants) hath so little abated the Distemper, that it render'd it much worse. This Disease is sometimes painful to extremity, and very oft of a long continuance, insomuch that I have known it protracted to nine or ten Weeks, and doth not seldom leave other mischievous Diseases behind it.

What Concerns the Practicall Part of a Mania or Madness.

Bleeding frequently repeated in the Arm and Foot, also at the Hæmorrhoids, is commonly advised as an universal and necessary premiss, to answer the Indication of the Plethory of Humours and Spirits, that most Madmen are subject unto, occasion'd by their greedy and ravenous Appetite; notwithstanding if used more than necessary, it doth certainly cause a moaping, and still leave a *desipiensia* and depravation of their Internal Senses, so that there must be a great caution used in this particular. I do very well know, that by bleeding subtracting the matter, whereout that abundance of rapid and furious Animal Spirits is engendred,

gendred, the disorder of the Brain is oft lessened, but soon returns again upon the replenishing of the Body. By abating of the Blood, the Spirits are diminish'd; and consequently the heat of the Brain, which the violent motion of the Spirits occasion, must be in some measure moderated. However, I can look upon Bleeding no otherwise, than a concurring Remedy, or a remedy *per accidens*, and doth not directly answer the Indication of clearing the Body, and particularly the Brain, of those putrid, acute, pungent, Saline Particles, nor doth it make that change upon the Bowels, so as to prevent the engendring the same again, which is the chief Indication in the cure of a *Mania*.

Strong Purging by *Senna*, *Turbith*, and *Scammony*, and particularly by black *Hellebor*, is what the pretended Masters of Mad-houses do most depend upon, as some Physicians do upon *Antimony*, in the form of a *Regulus*, *Glass*, or a *Crocus Metallorum*, whereby they endeavour not only to throw off the *Saburra* or heap of gross excrementitious Humors, but by stimulating and shaking of the Nerves thro' the Vomits and Stools it moves, they do expect these slimy putrid Particles should be thrown off from the Brain and Nerves: And in this some have been successful, tho' but in few. The inconvenience lieth here, if by too frequent strong Purgations, you do drain the gross saline Humors of their *Serum*, which doth both render them fluid, and dilute their Acrimony, you do excessively sharpen those Humors, encrease the Obstructions and by violently fermenting of them (which strong Purgatives most certainly do) force them to steam up those putrid pungent Particles, whereby *Maniacs* are render'd much worse; wherefore it's more advisable, after a smart Purge or two, to depend upon moderate Purgatives, as *Pil. Tartar. Querc. Pil. Stomach. cum gum. Diacanna*, &c.

After

After all, Bleeding and Purgatives being only universal necessary premisses, the chief Indication is to rectifie the Bowels, so as to prevent the engendring those gross saline Humors, and to clear the Brain of the foresaid pungent Particles, whereby the severall parts of the Brain may be reduc'd to their natural figures and positions, and the exercise of their Function. I do not perceive, that practical Authors do recommend any Remedies of that kind with any confidence, neither do I find many Compositions describ'd in Dispensatories for that purpose, and those that are, differ little from such as commonly are advis'd against Hypochondriac Melancholy, and are to be used for a long continuance, the tediousness of which Course doth not only tire the Physician, but the Friends of the Patients also, who therefore commonly commit them to the care of such, as make it their business, and are willing to be watchful over them, and keep them quiet, and in a low moderate Diet, intermixing gentle Purgings, and Bleedings at Intervals, whereby some are recover'd. Now and then when they are very furious, and overwakenful, they give them Opiates. Some use Cupping to the Shoulders, with and without scarification; others use opiate Ointments to their Temples, and barbing of their Heads being shaved, with Decoction of Cephalic Herbs, Flowers and Seeds; also with Lyes made of the Ashes of Cephalick Herbs.

I have had the fortune to cure several, in a little more or less than six Weeks, by Bleeding of 'em twice or thrice, and Purgings them gently with Minerals. In the Intervals I gave them Antihypochondriac Tinctures, compos'd chiefly of Minerals.

By such sort of Remedies as these here hinted at, and the before-mentioned Method, very probably a whole Hospital of Mad-folks may be cleared

ed of ten times the number, and forty times less charge, in half quarter of the time.

Maniacs, whose Figures and Positions of the Filaments of the Brain and Nerves have been much changed, and displaced by a long continuance of their Furies, are incurable.

C H A P. XVIII.

Containing a particular Medical, and Chirurgical Observation.

1. **I**T hath been usual in case of great Hemorrhages at the Nose, and of loosing large quantities of Blood by Hawking, Coughing, by Stool, Menstruation, Hæmorrhoids, and by Wounds of internal and external parts, to endeavour the stopping of it by frequent Bleedings, or opening of Veins in several parts of the Body, as in the Arm, Hands, Legs, Anckles, Feet, Jugulars, under the Tongue, and Hæmorrhoids, though very oft to little purpose; bycause the said preternatural Bleedings have been frequently stoppt or suppressed, only by hindring of the expulsion of so much Blood, as those Chirurgical Bleedings have taken off; and if perhaps so much Blood has been tapt off, as to cause the remainder to move but feebly (by reason so many Animal Spirits, that move the Blood, have been likewise drawn off) possibly the Orifices, where the Blood then first preternaturally ouled or spun out, are subsided, sunk, or oft healed, and intirely closed again, though but very tenderly, as being subject
to

to be easily forced open again, should a new spring tide of Blood happen upon it. On the other hand it may be questioned, an Hæmorrhage being suffered to continue, until so much Blood is flow'd out, as thereby to loose a large measure of Spirits that move it, whether the said Hæmorrhage may or will not as soon, and with less hazard and dammage to the Body, stop of it self, though now and then in somewhat longer space of time? That it has done so very oft, is confirm'd by thousands of vulgar Experiments. All that can be said of this matter is, that by Phlebotomy a large quantity of Animal Spirits are at once and suddenly let out, which before moving the Blood too rapidly, now do move it much more slow, and consequently thereby the Blood begins to acquire a greater thickness and less aptitude to be moved; so that the Hæmorrhage must abate at least for such a time, as the Spirits rallying and terocitating again do *de novo* attenuate and impetuously drive on the Blood again. In case of a Hæmorrhage by Plethory, the advantage of Phlebotomy is some what more evident.

2. On the other hand, that an Hæmorrhage in some cases is accelerated by Phlebotomy, has been generally observed by several, and the oft in such cases it has been put in use, still the Hæmorrhage has increased; bycause it is the external Heterogeneous Air entring the Pores of the Body and its Vessels, doth more strenuously move the Animal Spirits that move the Blood, consequently the more suddenly or copiously Blood is taken away, the more Air must suddenly enter to quicken the flood of Blood, as is observed in the pouring of Liquor out of a full Bottle; the nearer the Bottle is running off towards the middle, the quicker and in a fuller round stream the liquor flows out in the pouring it off; bycause the Air entring the capacity of the Vessel in a greater quantity, ex-

erts

gives a far stronger force upon the Liquor in pressing it down, to flow much quicker out.

3. The apparent truth of this whole matter is, that it's a mistake, that Bleeding alone out of the Arm, Leg, or other part abates, or removes an Hæmorrhage (occasion'd by any other cause than a Plethory) at the Nose, Stomach, or other internal or external part so much (otherwise, than by retarding its motion for a while) as is commonly thought; but it's also the hard bandage to keep on the bolster upon the Orifice Phlebotomy made, retards and stops the Bleeding in a great measure, which I do plainly prove by the use and advantage, that is, and may be made a thousand times greater, than any is made hitherto of the knowledge of the fortuitous invention of the circulation of the Blood, which all Men do observe, is chiefly at the terminations of the Arteries and Veins, that are more numerous towards the extremities of the Joints, than in other parts; consequently that as the greater proportion of Blood is transmitted thither out the Arteries from the Trunk and greater Vessels, so must a greater measure be return'd thence to the greater Veins and Trunk, whence it's afterwards effused so plentifully by those forementioned Hæmorrhages. Now you may please to observe, if you stop the reflux of Blood from that Arm, Leg, or other part (where Phlebotomy has been made) by bandage, for so much the Blood must be stop't or lessened, as did usually flow from that part before Phlebotomy. That this is so, is farther evidenced, in applying the Ligature not upon the Orifice, but two or three Inches below, the Blood will as soon be stop't, abating so much as will flow out between the Orifice and that Bandage below. The use that may be made of this Observation is, that very often Persons, whose Blood is thin, hot and sharp, and rapid in its motion, are very apt to Bleed again, notwithstanding the Bandage made upon

upon the Orifice, which I have known has been the cause of some Diseases; that have proved mortal. To prevent this return of Bleeding, you need only apply two or three more Bandages made pretty streight below the Orifice, and you shall find this will effectually stop the Bleeding again; but then you must be careful, that those Bandages continue on no longer than is necessary.

4. In reference then to stop any Hæmorrhage, you need only (where there is no Plethory) without any necessity of Letting Blood, and much less of repeating it two or three times (oft to an irreparable damage,) tie on two or three Ligatures towards the lower part of each Joint, and you may expect an infallible Relief, whereby you will prevent this so commonly *ludere de corio humano*. I cannot here proceed in setting down the true uses and abuses of Phlebotomy, which ought to be explain'd by matter of Fact and ocular Evidence, this Treatise being already cram'd with greater variety of Discourses, than the design of it will bear. But before I leave this subject, I must advert you, that those foresaid Ligatures must continue on so long, until the Blood below them (that is towards the extremities) be well settled, which you will discern by the tumefying, and extreme redness of that part. The settling of the Blood is the stagnating, or not moving of the Blood, whereby it is immediately thickned; for as the violent and quick Motion causes the thinness of the Blood, so the diminution or retarding of motion makes it thick, and stagnation renders it very thick, which is that they commonly call coagulated Blood. I must also repete the forementioned caution, that those Ligatures be not continued too long: for then there must unavoidably happen an inflammation upon the sudden taking off the said Bandages; so that after a just proportion of

time for the continuance of those Bandages, they must be slackned gradually. Moreover if those Bandages continue on longer than what will occasion a *Phlegmon*, there must happen a beginning of a Gangrene, at least a perpetual *Atrophia*, or some other dangerous external Disease, as a *varix*, Skirre, Aneurism, the turning of the Nerves into a perpetual rigid Cord, &c. You may farther observe, a *Phlegmon* or inflammation of any part is caused by a stagnation in the Capillars, not by extravasation, which is an old mistaken Physical cant. 2dly, All Erysipelases are occasioned by the stagnation of thin, sharp, hot Blood, and most Oedema's by a stagnation, or at least a degree of stagnation of the Glandulous *Lympha* in the *Lymphaducts*.

5. This to me is a general Rule, whatever thickens the Blood in the Joints, doth stop all Hæmorrhages; wherefore putting the Legs and Arms into cold Water, or stuping them with Vinegar, or Water, wherein common Salt and Salt Petre are dissolved, doth oft very effectually suppress Hæmorrhages, and so doth the application of the same to the *Scrotum*. On the contrary, violent Friction of the Extremities, or of any other part, or any painful contorsion of the Fingers and Toes, do all accelerate the motion of the Blood by thinning of it. Surgeons that are to open a Vein, that lies deep, and is not turgid, do oft rub the inside of the cubit, and lower part of the Arm, and smartly clap the Palm of the Hand, though sometimes with little effect; the Blood being thereby render'd thinner flows through the cubit Veins the faster; but if they take this Method, first to tye on the Ligature, and then let the Arm hang down, in which posture if they rub it very smartly, they cannot fail of making those Veins swell as much, as the depth of their Position will permit them.

6. I Know

6. I know no Disease, wherein frequent Bleedings are so generally advised in cold Climates, as in Pleurifies, and Rhumatisms; which latter are either Internal, or External. The External is either fixt to a certain part, viz. in the interstice between two Joints, be it the Arms or Legs, and sometimes in the Breast, which last is vulgarly termed a Bastard Pleurisie, or vagrant, commonly stiled *Arthritis vaga*, or running Gout, which I take to be caused by an acid abounding glandulous *Lympha*, render'd corroding and extremely painful by the admixture of malignant acid Particles of the external Air, crowding in and mixing with the said *Lympha*, which through those said malignantly acid Particles shrink and close up the Orifices of those Vessels, that should receive it, in which case it must necessarily have its passage precluded, and come to stagnate, thereby corroding and torturing the Tendons and Membranes near the Joints so long, as either it is discuss'd through the pores, or in some measure taken up by the said Vessels, being render'd somewhat tamed, and less corroding. Now you are not to conceive, if upon the ceasing of a Pain in one Joint, it soon appears again in another, that it is the same particular proportion of *Lympha* that caused pain in one part, doth so suddenly mount up and afflict another part; for that is unintelligible but it's the Animal Spirits, that were the efficient cause of pain (the *Lympha* being only the material cause) in the first, do withdraw themselves from the part first affected (the pain being now assuaged by the Lymphatic matter being discuss'd) to another part, where they meeting with new corroding Lymphatic matter, do occasion that second Arthritic pain. Those frequent Bleedings before mentioned I cannot apprehend, do otherwise abate those pains, than by diminishing the Blood, and Animal Spirits (being confected out of the

Blood) and subducting part of the *Serum*, whereby the *Lympha* is also lessened. Now consider, suppose, that by eight, nine, or ten Bleedings you have tap'd off so many Animal Spirits, as not to leave sufficient to digest, discuss and throw out those malignant acid Particles, the consequence of this must be a great weakness of the Bowels and Joints, the Blood extremely fow'r'd, a ghastly pale wither'd Visage, and a long tedious Disease. This Bleeding method exercised upon Patients after fifty, I have more than once observed to turn vagrant Rhumatisms into Convulsions, and irrecoverable Palsies, I have likewise observed that sometimes by once Bleeding largely this Disease has been render'd considerably worse, by sowing the Blood and other Juices. As for Purging, that infallibly row'ses this Disease into a fury, by stimulating the Animal Spirits, and rarefying all the Juices. After all, twice, or at most thrice, moderately Bleeding, according as the Circumstances may require, ought not to be exceeded, and the Patient is to be treated with Volatil Balsamics, and a Decoction of *Sarsa*, *Germander*, a very small proportion of *Ground pine*, &c. Also with proper Purgatives; but by no means with Acids; those Rhumatisms being materialy caused by eating fow'r Fruits, or drinking fow'r Wines, as may be plainly proved by this experiment, of pouring Vinegar, Spirit of Sulphur, or almost any other acid upon Blood newly let out by Phlebotomy, which though appearing never so floridly red, will turn blueish and fizy, which is the colour and consistency of Rheumatic Blood: So that to pretend to cure this Distemper by acids is equal to render Wine that's upon sowing sweet, by pouring Vinegar, or Spirit of Vitriol, or Sulphur to it, which is most absurd. A fixt Rheumatism commonly caused by the dripping of a vitiated malignant nervous *Lympha* upon the *periostium*

riostium, (which it terebrates and rakes into that excessive pain) is oft cured by once Bleeding, and a Mercurial Purge or two. Wherefore where *Riverius* in his Observations declares, he has cured several Rheumatisms by a single Bleeding, and a Mercurial Purge, can only be understood of a fixt Rheumatism. In Pleurifies, if you proceed to too many Bleedings, there will not be Animal Spirits enough either to digest, concoct, or mature the inflammation, and afterwards to throw the matter up by Expectoration, which consequently must either turn into an incurable Empyema, or a *Sphacelus* of the *Pleura*, which has been oft observed. Notwithstanding I will not be too positive, but refer these difficulties to the determination of those Physicians that are sincerely Candid, truly Learned, and long Experienced; but such as are Supercilious Arrogant, Romancers, Avaritious, and self designing, ought to be had less in esteem than Canal-rakers.

7. Since I have been so lately Discourfing of Phlebotomy, I Judge it not amifs to offer my Opinion concerning Faintness, that attends, and follows some Persons in and after that Operation, which I shall form into Quære's, after I have expressed the meaning and degrees of Faintness. *Languor* and *Languidus* signifying Faintness and Faint, are words compounded of *levis* *angor*, or a slight, pressure, pain, anguish, or streightness, from the Greek Word *ἀνχω*, or *ἀνχουα*. *stringo* or *stringor*, whence also is derived the Disease *Angina* i. e. *constrictio in faucibus*, or *strangulatio* i. e. *strictus angor*. This, *viz.* *languor* being the first and lowest degree of a defection of the Animal Spirits, the next is *ἀνχω* *ψύχα*, or *relictio Spiritus* or Breath, that is such a degree of Faintness, wherein your Breath seems, or is ready to leave you; for *ψύχα* is derived from *ψύχω* *spiro*, I Breathe, and therefore *ψύχω* the Soul *Spiritus*

or the Breath of God is said in *Genesis*, To be breath-
 ed into the Body he formed for her. The next higher
 step of Faintness is *Animus*, or the Minds,
 or *Animus* its desertion and leaving of the Body,
 which though it appears to be a lower step than
 the Breaths or Souls leaving the Body, yet *realiter*
Lypothymy and *Lypopsychy* are the same, un-
 less you mean (as Physicians here in this Sense
 do) by Breath the breathing of the Lungs, and
 then *Lypopsychy* doth imply a lower degree
 than *Lypothymy*. The first *Quere* is, what is the
 cause, why all Persons are faint or faintish after a
 greater Bleeding than is requisite? I said greater
 Bleeding than requisite; bycause a just proportion
 of Blood taken off by Phlebotomy or otherwise,
 doth rather strengthen a Plethoric Body by taking
 off and lightning some of its burden. It's answer-
 ed, the immediate loss of Animal Spirits, that
 are let out with the Blood, and the loss of the said
 Spirits, that are immediately by the loss of Blood
 (whereout the Animal Spirits are made) dimi-
 nish'd or rather prevented from being engendred,
 do cause a Man to faint. 2dly, Why are some
 Men, and not seldom the strongest of 'em, subject
 to faint away, or fall some into *Lypopsychie*,
 and others into *Lypothymies* soon after the stop-
 ping of Bleeding by Phlebotomy, and not oft be-
 fore? It's resolved; bycause by the imposition of
 the Bandage, which commonly, though by mi-
 stake, Surgeons are apt to tye on more streit,
 than on the weaker sort, the circulation of the
 Blood from that Joint is more intirely intercepted
 and interrupted, their weighty Bodies requiring
 a greater supply of Spirits, and the transmission
 of Animal Spirits (that are to be engendred out
 of the Blood) through their gross condensed Tu-
 buli of the Nerves (being pressed and streightned
 by their gross fibrous Flesh upon them) from
 the Brain to the Joints in some measure being abated

or suppressed, their strength must necessarily sink on a sudden, and they fall into a Lypopsychy or Lypothymy; whereas in a weakly and softer Body, on which the Bandage to suppress their bleeding at the Orifice, is made looser, and their Blood being thinner doth in a greater measure by circulation return to the Brain, whereout the generation of Animal Spirits being continued secures them from fainting. 2dly, By the sudden stoppage of the Blood by the Finger (the Bleeder usually imposes upon the Orifice) and the streight bandage, the Blood rebounds to the Source, whereby commonly a small stagnation is occasioned, and very oft a twirling and turning round as it were at the said Source, which being continued to the Brain, causes the same twirling and inordinate turning round of the Animal Spirits in the Brain, which most of those Fainters perceive just before they fall into a Swoon, and consequently is the cause thereof. This rebound is equally visible in a Tub of Water running out of a long Pipe fixt to the Tub, which being stoppt suddely with your Finger causes a rebound of the Water in little streams, continued to the Water in the Tub, causing the Water there likewise to turn round. As for the distance that is no manner of hinderance, bycause of the continuity of parts, as may be observed in the motion of the Air that's caused by a percursion of it at one end of a long Tree occasioning a Sound, which is easily perceived at the other end by the continued motion or rending of the continuous Air about the Surface in lenght of the said Tree to the other end.

F I N I S.



